CHIROPRACTIC DIAGNOSIS

FIRTH

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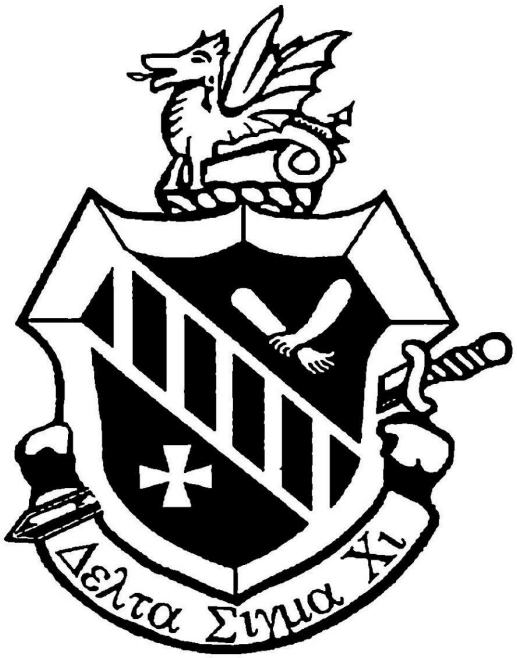

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Leland T. Pollock.

1. Age
2. Occupation
3. Past history
4. Family history.
5. Present illness.

1. How long?
2. What does it remind you of?
3. Have you had it before?
4. Where is it located. (Pain)?
   (a) what type.
   (b) When is pain present?
   (c) What relieves pain?
   (d) any medical treatment.
5. Do other members of family have same condition?
6. What irritates the conditions?
   (a) [illegible]?
   (b) posture?
7. Appetite, bowel movement, kidney function.

A TEXT-BOOK

on

CHIROPRACTIC DIAGNOSIS

By

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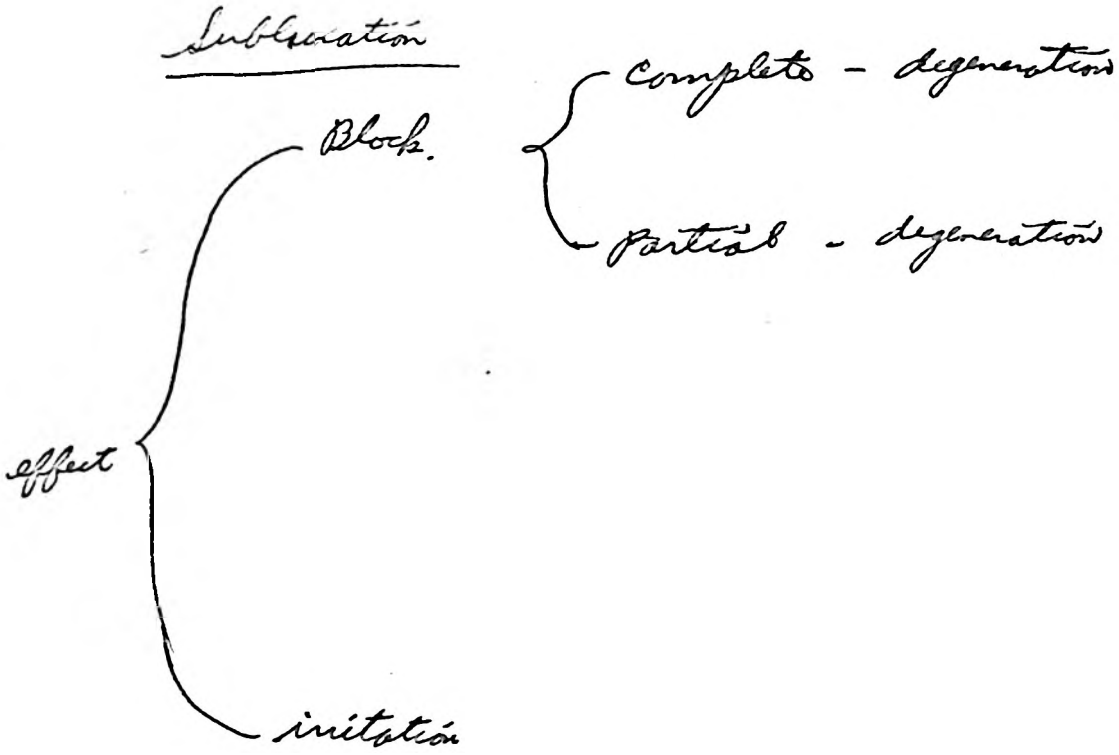

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By JAMES N. FIRTH, D. C., PH. C.

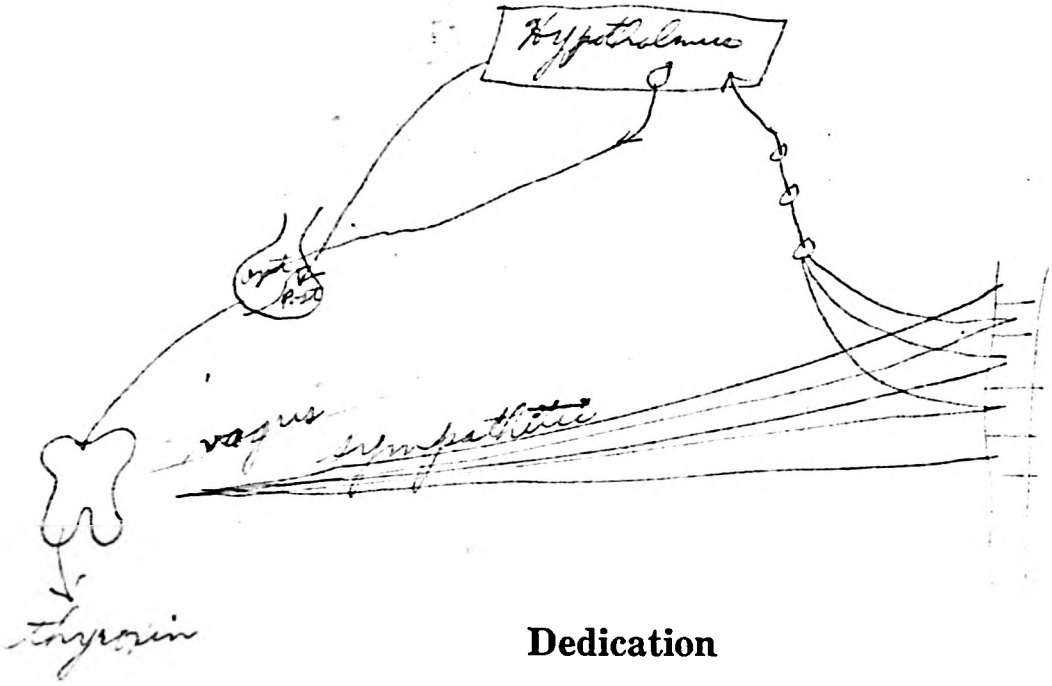
PREFACE

The first edition of Chiropractic Symptomatology written in 1914 was well received by the profession. This is also true regarding subsequent issues of the old work. It was written in condensed form and enabled the student to gain the Chiropractic idea of diseased conditions without exhaustive searching and extensive notes. The scope of the work has been greatly enlarged by the addition of several new sections on physical examination of the patient. These new sections make the book more useful to the student and also to the field practitioner. Not only are the physical findings stated but the process of making the physical examination is clearly described and the significance explained.

The aim of this volume is to enable the student and Chiropractor to become more fully equipped in dealing with human ills. It is highly essential for the Chiropractor to know the location and nature of the diseased condition before he can explain its existence or even presume its exciting causes. The average Chiropractor is well informed on primary cause of disease and this is well indeed. He must continue to be well versed on this subject if he is to succeed. However, his usefulness will be enlarged as he broadens his knowledge on the nature and extent of diseased processes, and views all of the etiological factors rather than one. It is hoped this volume will serve to assist the practitioner in thus enlarging his usefulness.

The author is indebted to Drs. H. E. Vedder, A. G. Hendricks, and L. M. King for assistance and co-operation in preparation of the manuscript on the sections dealing with examination of the Respiratory Organs, examination of the Abdomen and Urinalysis.

JAMES N. FIRTH



Dedication

Chiropractic is judged by the people who represent it and the things they do and say. As a science it stands today exactly where its representatives stand. The progress it has made has been made by the few thousand Chiropractors representing it throughout the world. Most of them are striving to improve themselves and their methods so that their science will receive the public favor that its efficacy justly merits.

To the members of the Chiropractic Profession, who have made Chiropractic what it is and who are striving to improve it, is this volume dedicated.

The cells in the hypothalamus secretes a hormone-like substance. This substance is governed by the para + sym nervious systems. It reaches the ant lobe by way of the blood stream. The post lobe has a direct nerve supply, the ant lobe secretes the thyrotropic hormone + governs the production of thyroxin from the thyroid. An over activity of the sympathetics cause a hyper secretion of the hormone like substance from the cells in the hypothalamus resulting in an over production of the thyrotropic hormone from the ant lobe of the pituitary causing an over production of thyroxin from the thyroid gland causing exopthalmic goitre.

Know these for straight Chiro boards
but not necessary for Basic Board.

List of Abbreviations Used

Upper Cervical—First Four Cervical.
At.—Atlas.
Ax.—Axis.
C.—Cervical.
M. C. P.—Middle Cervical Place.—3, 4 and 5.
L. C. P.—Lower Cervical Place.—5, 6 and 7.
A. P.—Arm Place.—Region of the First Dorsal.
H. P.—Heart Place.—Region of the Second Dorsal.
Lu. P.—Lung Place.—Region of the Third Dorsal.
Li. P.—Liver Place.—Region of the Fourth Dorsal.
C. P.—Region of the Fifth Dorsal.
S. P.—Center Place.—Region of the Sixth, Seventh and Eighth Dorsal.
L. S. P.—Lower Stomach Place.—Region of the Eighth Dorsal.
Spl. P.—Spleen Place.—Region of the Ninth Dorsal.
K. P.—Kidney Place.—Region of the Tenth, Eleventh and Twelfth Dorsal.
Upper Lumbar—Region of the First and Second Lumbar.
Middle Lumbar—Region of the Second, Third and Fourth Lumbar.
Lower Lumbar—Region of the Fourth and Fifth Lumbar.

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"You do not know enough the moment you believe your education is over. You cannot teach after you stop learning. No allegiance is paid to inefficiency. No matter who you are or what you do—doctor, lawyer or merchant—your guidance will be deserted, your counsel avoided and your wares rejected in the face of better brains *or* brands."

SECTION I—CHAPTER I

PRELIMINARY CONSIDERATIONS

Diagnosis is that branch of science which teaches the act or art of determining the presence of disease by means of signs and symptoms. It also includes any conclusion reached. The word literally means to know, to see through, to distinguish. The word diagnosis is commonly used in two separate and distinct ways. First, it is applied to that branch of science, a knowledge of which enables one to discriminate between the normal and the abnormal and the purpose of which is the determination of the location and nature of disease. Second, it is applied to the conclusion reached from the examination. In the former sense the practitioner uses diagnosis and diagnostic methods in his investigation, while in the latter sense he arrives at "a diagnosis" or opinion concerning the location, nature, or cause of the trouble.

A diagnosis is, therefore, any decision reached, such as stomach trouble, indigestion, gastritis, spinal curvature or seventh dorsal subluxation.

The two major phases of diagnosis are **physical diagnosis** and **symptomatology.** Physical diagnosis is that division of diagnosis dealing with physical examination of the patient. The methods employed are inspection, palpation, percussion, auscultation, mensuration, and sucussion. Any indication of abnormality discovered by any of these methods is called a **physical sign.**

Symptomatology is that division of diagnosis dealing with symptoms and their significance. A symptom is an abnormal

physiological action, or it is a sign or manifestation of disease. Symptoms are objective and subjective.

Subjective symptoms are those which can be appreciated by the patient only. They are sensory disturbances, such as pain, tenderness, fatigue, headache, nausea, and vertigo.

Objective symptoms are those which can be detected by examination of the patient, therefore, they are discoverable by the examiner. An objective symptom is a physical sign. The character and rate of the pulse, respiration, temperature, posture, color, facial expression, gait, spinal subluxations, and curvature are examples of objective symptoms. Physical signs depend upon the physical nature and structure of the part examined and denote diseased conditions, not particular diseases.

A direct diagnosis is made when the case history and the clinical symptoms all clearly point to the one disease. It is commonly used in detecting lobar pneumonia, quinsy, mumps, and a multitude of other common clear-cut conditions.

A differential diagnosis is the determining of the essential characteristics between two similar diseases. A patient may present symptoms, many of which are common in several diseases. The symptom groups of the several diseases suggested may then be compared with the case in question until all are eliminated but one.

Anatomical diagnosis or post mortem diagnosis is one made after death and is based upon the anatomical tissue changes. This is of no practical value outside the laboratory.

Pathology is that branch of science which teaches the abnormal structural changes occurring in disease. The pathological changes may be microscopical or macroscopial. Microscopical pathology deals with those changes in the cell and other minute changes that can be seen only with the microscope. Macroscopical pathology can be seen with the naked eye. It is also known as gross pathology.

A neurosis is an abnormal function of a part without any discoverable pathological change. Neuroses affect the motor, sensory, or secretory functions.

Chiropractic analysis is the determining of abnormal expression of function, what primary function is expressed abnormally, how it is expressed abnormally and what causes this abnormal expression. The analysis of a case is based upon information gained through interrogation and examination of the patient. The information thus gained consists of symptoms and signs. Before these symptoms can be given their true value in the equation, it is very essential for the student or practitioner to have a basic understanding of physiology, anatomy, pathology, and diagnosis. Pathological changes are judged by the symptoms and signs. Symptoms cannot be analyzed because they are elements of disease; but they do suggest a diseased condition, the nature of which can be analyzed.

An **organic disease** is one in which there is discoverable change in the structure of the organ or tissue affected. A **functional disease** is one in which there is abnormal action but no structural abnormality. Functional diseases are also called neuroses.

Etiology is that branch of science which considers the cause of disease. Causes of disease may be classed as primary, secondary, predisposing, exciting, internal, external, and specific. Of these the primary cause is the important one. Every diseased condition must have a primary cause. The primary cause is not only the first cause, but it is also the chief or principal cause. The vertebral subluxation is the physical representative of the primary cause of disease. The primary cause of disease is interference with the transmission of impulses from the brain to the tissues. This lowers vitality and resistance and perverts function, which in itself is disease. Infection is a commonly accepted cause for many diseases. One of the vital requirements for infection is lowered tissue resistance. The resistance of tissues may be lowered by mechanical, chemical,

thermal, and electrical stimuli that are of a degree to be injurious. It is also caused by diminished innervation, and this may be caused by nerve pressure or tension which interferes with the transmission and expression of nerve energy in the tissues. For this reason Chiropractors maintain that interference with nerve conduction is the primary cause of infectious diseases, and the infectious agent is the secondary or exciting cause. Chiropractic adjustments remove the primary cause, thereby causing the secondary cause to be ineffectual.

A disease is said to be endemic when it prevails in a certain community more or less constantly. When a disease affects many people in a community, it is said to be epidemic. A pandemic is a disease affecting very large areas or several countries at a time. A disease is said to be sporadic when there is but an occasional case in a community.

The period of **incubation** is the interval of time that exists between the entrance of poison into the body and the development of symptoms caused by its action.

A **pathognomonic symptom** is one found in but one disease; therefore, it is a diagnostic sign of great importance. Examples are strawberry tongue in scarlatina, Kopilk's spots in rubeola, Kernig's sign in epidemic meningitis, and rusty sputum in pneumonia.

A **complication** is a diseased condition developing during the progress of the original disease, such as pleurisy with pneumonia. A sequel is a diseased process that results from the original disease and remains after it disappears, such as abscess of the lung when resolution fails.

Diathesis

A diathesis is a general constitutional predisposition to certain forms of disease. This predisposition does not imply that the disease toward which there is a susceptibility is present; and, in fact, it may never develop. The diathesis merely signifies that most people having the disease conform physically to the diathesis of that disease.

Tuberculous diathesis presents a tendency to tuberculosis and is most commonly found in individuals with long, slender bones; oval-shaped face; bright, pearly eyes; delicate skin and colorings; stoop shoulders; and a hollow chest.

The **gouty, arthritic** or **rheumatic diathesis** presents a tendency to gout, arthritis, or rheumatism and is marked by a well developed body, a fleshy round face, thick hair, good teeth, hearty appetite, strong heart, high blood pressure, and a tendency to obesity.

The terms fatty, neuropathic, hemorrhagic diathesis are also used in connection with patients of these tendencies.

Cachexia

Cachexia is a condition of pallor plus sallowness, resulting from the disintegration of the red blood corpulses, due to malnutrition, and characterized by emaciation, debility, and discoloration of the skin.

Cancerous cachexia develops in the course of cancer of any portion of the body and is marked by emaciation, debility, anemia, and a dirty, yellowish-brown color of the skin, which is most observable around the neck and the angle of the jaw.

Syphilitic cachexia occurs in the majority of syphilitic cases and is marked by anemia of a severe type and a muddy pallor of a yellowish-green tint which is noticeable in the skin and conjunctiva of the eyes.

Posture

The posture of a patient in bed will vary with various diseases; and although many diseases may have the same posture, it is often of value to know the characteristic postures and their indications.

1. The **dorsal strong** or active posture is a posture of health and does not have any diagnostic importance. In this the individual lies comfortably upon the back with legs extended and without any indication of pain.

2. The **dorsal inert** or **passive posture** is observed in febrile diseases in which there is great weakness, such as typhoid fever. In this posture the patient lies upon the back but is constantly slipping down toward the foot of the bed so that he soon acquires an uncomfortable position, which hinders respiration.

3. The **rigid dorsal** posture is commonly met with in acute diffuse peritonitis. In this posture the patient lies upon the back with both legs drawn up and the thighs flexed upon the abdomen to lessen the friction pain.

4. The **lateral** posture is one in which the patient constantly lies upon one side to favor respiration or obtain comfort. This posture is commonly seen in unilateral pneumonia, pleurisy with effusion, enlargement of the heart, and unilateral tuberculosis. In each case the patient lies upon the affected side to permit greater expansion of the unaffected side.

5. **Opisthotonus,** though not always considered a posture, is found as a characteristic symptom in a few diseases or conditions. It is a position in which the patient rests upon the back of the head and the heels, the trunk being arched forward. It is found in tetanus, uremia, and spinal meningitis.

6. **Emprosthotonus** is a posture in which the trunk is arched backward, the patient resting face downward upon the toes and forehead. It is found in tetanus and sometimes in hysteria.

7. **Pleurothotonus** is a posture in which the trunk is arched literally, the patient resting upon the side of the head and the side of one foot. It is found in meningitis, tetanus, and strychnine poisoning.

8. **Orthopnea** is the condition wherein there is the necessity of assuming the upright position in order to facilitate respiration. It is found in bronchial asthma, emphysema, and heart disease or in cases of fluid in the pleural cavity.

Gait will come under inspection.
ataxia = failure of muscle coordination

Gait

important

Every individual has a gait, or manner of progression, which is peculiar to that individual, but there are also various modes of walking peculiar to certain diseases, which will be considered here.

gait of syphilis

The **ataxic gait** is so named because it occurs in locomotor ataxia. The patient walks in a stooped posture with the eyes looking at the feet. The foot is raised unusually high, thrown forward with undue force, and brought down to the ground flat-footedly with a stamp. While in the air before being brought down, the foot wavers as if there is a degree of uncertainty in the wisdom of bringing it down. The patient walks with his feet wide apart and is constantly looking at them; this is done for the purpose of supplementing the loss of the muscle sense.

The **steppage gait** is also called the prancing or highstepping gait, and is commonly found in infantile paralysis, multiple neuritis, and paralysis due to arsenic poisoning. In this gait the flexor muscles of the foot are the subject of a flaccid paralysis so that the toes hang downward when the foot is raised from the ground. In order to prevent the toes from dragging upon the ground or from catching upon objects, the foot is raised very high and brought to the ground forcibly before the toes can drop; thus the foot strikes the ground heel first. The gait resembles that of a man walking in tall grass, hence its name.

The **spastic gait** is common in diseases that have a spastic paralysis of the extensor muscles and is common to spastic spinal paralysis, lateral sclerosis, and some other forms of myelitis.

In this gait the legs are firmly extended, the foot is dragged along in a shuffling manner with the toes scraping upon the ground, and in order to permit one foot to pass the other, the pelvis is tilted slightly. In some cases the adductors contract, causing the legs to cross, as is seen in Little's disease. In

spastic hemiplegia there is a unilateral spastic gait, in which the pelvis is tilted and the leg is swung around in front of the other with the toes often scraping on the ground. This is also called the **mowing gait.**

Festination is the characteristic gait of paralysis agitans or Parkinson's disease and is also called the **propulsive gait.** In this the body and head lean far forward; and the patient walks with short, hurried, shuffling steps, making it appear as if he is being pushed and is about to fall. It is difficult for a patient with this gait to stop suddenly or to turn a corner.

The **waddling** or **goose gait** occurs where there is extreme muscular weakness in the thigh and hip muscles, as is characteristic in pseudohypertrophic muscular paralysis and muscular atrophy. In this gait the shoulders are thrown backward, the lower part of the spine is in a state of lordosis, the pelvis is greatly tilted, and while thus raised the leg is brought around and placed upon the ground. When walking the patient swings from side to side in a very noticeable manner.

The **cerebellar ataxic** gait resembles that of an intoxicated person. The patient walks with the feet wide apart, takes short steps, and sways to and fro to such an extent that progression is almost impossible. This gait is found in tumor of the cerebellum and disease of the semicircular canals of the internal ear.

Pain

Pain is an uncomfortable sensation resulting from the interpretation of impressions arising from an abnormal condition within the human body or from an external stimulus which has a detrimental effect upon the body. In a sprained ankle the ligaments are stretched. There are sensory impressions constantly arising from this abnormal and sprained ankle. These impressions reach the brain and are interpreted, and efferent impulses are sent out to the point from which the impression originated, transferring the sensation to the periphery as pain. The sensation of pain, however, occurs in the brain.

Neurosis pain can be worked off, walk against etc.

This pain is adaptive to prevent further use of the injured part until it can be properly and naturally repaired. If the skin should be pricked with a needle, an impression is immediately sent to the brain, where it is interpreted as pain; and motor impulses are sent back to the muscles, which causes them to contract and withdraw from the injury.

Pain may be classed as acute and chronic and varies in intensity from sharp or acute to dull and aching. It may be local or general according to the condition from which the impressions arise.

Acute pain usually begins suddenly, is of a severe character, and indicates an acute inflammatory condition of nerves, nerve sheaths, serous membranes, or synovial membranes or an acute pressure upon nerves without inflammation. Of the former we have good examples in peritonitis, pleurisy, arthritis, appendicitis, cystitis, etc.

Dull or aching pain, as that found in case of a bruise, is found in acute inflammations of mucous membranes or chronic inflammations of serous membranes. Dull pain is found in pharyngitis, gastritis, tonsillitis, acute catarrh, pyelitis, prolapsed organs, and pressure from growths.

Both acute and dull pain may be **intermittent** or **paroxysmal.** A dull paroxysmal pain is usually produced by some irritant coming in contact with a chronic condition of some kind, such as food in chronic inflammation of the stomach or the passages of the feces in ulceration of the intestine. Paroxysmal acute pain is common in the neuralgias, gastric ulcer, rheumatism, neuritis, and the lightning pains of locomotor ataxia.

Gnawing, burning or itching pain nearly always takes place in the mucous membrane lining the abdominal viscera where the sensory nerves are less numerous. It is very characteristic of cancer and may be located in any area in which cancer could appear.

Cramp is a painful muscular contraction. Abdominal cramps are most common and constitute gastralgia and enteralgia, in which there are spasms of the muscles of the stomach and intestines.

In all inflammatory diseases pain is greatly increased upon motion, because the dry and inflamed surfaces come in contact with each other and the friction thus induced produces intense pain.

Diffuse pain, as its name implies, is scattered over the entire body, not being located in any organ. It is common during the initial period of the acute febrile diseases, tonsillitis, and rheumatism. When diffuse pain is located in the head, it is spoken of as a general headache. Headache, however, may be localized, pointing to local causative subluxations.

A **headache** located in the forehead or over the eyes is spoken of as a frontal or eye headache and is caused by a local subluxation in the upper or middle cervical region. A headache located in the region of the temples is called a temporal headache and is usually caused by an Li. P. subluxation. A headache in the back part of the head is called an occipital headache. It may be caused by an atlas or axis subluxation but is more frequently caused by a lumbar subluxation. A vertical or sick headache is the result and a symptom of disorders of gastric digestion and will be relieved by an S.P. adjustment. A headache at the crown of the head is more rarely encountered than any of the others and indicates kidney trouble. It can be relieved by a K. P. adjustment.

Tenderness is a sensory symptom, frequently encountered and may be defined as pain upon pressure; and although there may be a condition which would cause tenderness if pressure be exerted, yet no abnormal sensation will be felt so long as there is no pressure. It is upon this fact that nerve tracing is based—nerve tracing is a method of following the course of tenderness over nerves that are impinged. Nerve tracing will usually assist in locating the cause of pain, tenderness, and headache.

Aside from pain and tenderness there is another classification of abnormal sensation called paresthesia. **Paresthesia** is a perverted sensation or uncomfortable sensation not amounting to pain. The most common paresthesias are weight or bearing down, coldness, faintness, formication or itching, fullness, girdle sensation, numbness and tingling, precordial constriction, and weakness or debility.

The sensation of **weight** is most commonly found in the pelvis and is more frequently found in women than in men. It is symptomatic of prolapse of the uterus, pelvic tumors, or falling of the abdominal viscera.

The sensation of **coldness** is present at the beginning of a fever or during the chill stage but also occurs in a few cases in which the body temperature is normal. These are usually diseases of the nervous system and the sensation only imaginary. It is found in neurasthenia, hysteria, and chorea.

Faintness is a feeling of extreme bodily weakness with a cloudiness of the intellect and occurs from cerebral anemia. This may be produced either by an H. P. subluxation, in which the heart is affected to such an extent that the brain is not receiving sufficient oxygen to maintain consciousness, or may be caused by an atlas subluxation, in which the vasomotor nerves of the vessels of the brain are impinged, thus causing a spasm of these muscles and rendering a part or whole of the cerebrum anemic. It occurs in diseases of the heart, and hydrothorax, pleurisy with effusion or sometimes as a result of great emotion, fatigue, or excessive heat.

Formication or itching is a sensation of insects crawling upon the skin. It occurs in diabetes, jaundice, and skin diseases. General formication is more common in cases of hysteria and neurasthesia.

The sensation of **fullness** is most common when the abdomen is distended by gas or fluid, as in gastritis and ascites, or may be present when there is pressure by an enlarged or prolapsed organ.

meteorism = gas within abdominal cavity.

The girdle sensation is an important and common paresthesia found in diseases of the nervous system. It is a subjective sensation of a tight band drawn around the waist. It is found in locomotor ataxia, myelitis, and tumor of the spinal cord.

Numbness and tingling may occur in the feet during the initial stages of locomotor ataxia, apoplexy, tumor of the brain, spinal meningitis, neuritis, myelitis, and neurasthenia. It indicates the loss of the sensory function, and the above list is but partial.

Precordial constriction is a feeling of tightness in the chest which is near to the point of suffocation and encountered in those diseases accompanied by intense dyspnœa, such as bronchial asthma, emphysema, angina pectoris, meteorism, and heart trouble.

Weakness or debility attends the onset of all febrile diseases and appears toward the close of the wasting diseases. It may be especially marked in some diseases, such as diabetes, cancer, anemia, influenza, tuberculosis, and neurasthenia.

Vertigo or dizziness is a subjective sensation of a loss of equilibrium. When it appears that the patient himself is falling, rising, or whirling, it is called subjective vertigo; and when the objects around the patient appear to be in the state of motion, it is called objective vertigo. Both subjective and objective vertigo may be classed as horizontal if present only when the patient is lying down. Horizontal vertigo always disappears when the patient assumes an erect position. Vertigo itself is always a symptom and not a disease. It may be found in disorders of the heart, liver, and stomach and disease of the semicircular canals of the internal ear.

Disturbances of Consciousness

Consciousness is the ability of the mind to cognize impressions which are capable of producing physical or mental sen-

objective = can be seen. = patient falls
subjective = can not = " feels
State board question,
Meinner's disease = disease of ear,

sations. **Unconsciousness** is a condition in which there is no cerebral appreciation. The loss of consciousness may occur gradually or suddenly and may have varying degrees of completeness.

Somnolence is the slightest disturbance of consciousness and is characterized by a marked tendency toward sleep from which the patient can be easily aroused.

Stupor is a more decided loss of consciousness into which the patient may pass, and from which he can be aroused only by extraordinary means.

Coma is the most severe form of unconsciousness from which the patient cannot be aroused. Coma vigil is a severe and grave form of coma in which the patient lies with his eyes open but is entirely unconscious of his surroundings. It may be accompanied by a low muttering delirium.

Delirium is a state of mental agitation characterized by incoherent speech, delusions, and sensory perversions. Delirium may be **active or wild**, in which it is necessary to use physical force to prevent the patient from personal injury; or **mild and muttering**, in which the patient lies still, busily engaged in his incoherent speech.

Wild delirium is commonly found in delirium tremens, while mild delirium is more common in cases of extreme prostration in the course of high fever.

A **delusion** is an absurd and unfounded belief. An **illusion** is a false interpretation of impressions received from objects that really exist. An **hallucination** is a sense preception without a physical basis. Any or all of these various disturbances of consciousness may be found in the insanities or the typhoid status.

Coma

All forms of coma are characterized by a deep sleep from which the patient cannot be aroused, but each form has its peculiar symptoms by which it can be recognized and differentiated from the others.

Opium coma is a state of narcosis, resulting from the introduction of a large quantity of opium into the human body. In this the patient is deeply comatose; the pupils are contracted to pin points; the respirations are slow, varying from 12 to 4 per minute; the pulse is slow but strong and bounding; the face may be cyanosed because of the lack of oxygen; the cornea is insensitive, and there is retention of urine, which, if prolonged, may cause the appearance of uremic symptoms.

Alcoholic coma results from the extreme overabundant use of alcoholic liquor. The breath has a characteristic odor. It may or may not be possible to arouse the patient; and if he can be aroused, he resents the interference with blows and incoherent speech, characteristic of drunkenness. The respirations are deep and of normal frequency; the pulse is strong, full, and bounding; the pupils are of equal size and slightly dilated; the temperature of the surface of the body is subnormal; and there is absence of any paralytic symptoms, which is the most important point in the recognition of this coma.

Apoplectic coma results from intercranial apoplexy and is always profound, it being impossible to arouse the patient in any way. There is a hemiplegia, which can be determined by raising the limbs of each side and permitting them to drop; it will be noticed that the extremities of one side drop more flaccidly than the other. When smoothed, wrinkles on the unaffected side assume their former corrugations more readily than those on the unaffected side. The pupils are unevenly dilated, that on the affected side of the face being the larger. The respirations are of normal frequency but are labored; and there is blowing out of the lips to a noticeable degree on the affected side. Cheyene-Stokes respiration may be present in some cases. The cornea is insensitive, the temperature is above normal, and the head and eyes may be turned toward one side.

Uremic coma occurs in cases of uremia and is often initiated by a uremic convulsion. The face has the characteristic renal pallor, and the face and legs may be swollen from the renal edema. The skin is dry and harsh and has a character-

istic urinary odor. The urine contains albumin and casts and is greatly diminished in quantity; the respiration and pulse are irregular; the temperature may be normal, subnormal, or febrile; according to the severity and extent of the incoordination from which the uremia develops; and there are muscular twitchings noticeable in the wrists and legs.

Epileptic coma follows the epileptic convulsion and is recognized by a history of an epileptic attack, bloodstained foam upon the lips, bruises upon the head that may have been sustained in falling at the onset of the convulsion, and its brief duration. The entire duration of the coma may be less than half an hour but in most cases it lasts about one hour. The face is flushed and deeply cyanosed from the suboxidation of the blood because of the tonic spasm of the respiratory muscles during the convulsion.

Diabetic coma occurs in the terminal stages of diabetes mellitus. It may develop suddenly but is usually preceded by cloudiness of the intellect and disturbances of vision. The temperature is subnormal, the respiration is of normal frequency but labored, the pulse is full and bounding, there is a sweetish odor in the room, and the urine contains sugar. This coma is rarely mistaken, as it only occurs late in the course of diabetes mellitus.

Coma from sunstroke is usually recognized by the circumstances under which the patient is found, together with an abnormally high temperature, hot dry skin, flushed face, deep labored respiration, frequent and full pulse, and the profoundness of the coma.

Hysterical coma occurs in connection with hysteria and is more easily recognized after observation of a case than from description. The coma is preceded by an attack of hysteria, minor or major. The face is flushed; the respirations are rapid but not labored; the pulse is normal; the pupils are normal in size and equal and respond to light; the cornea is sensitive; the eyeballs are upturned; the facial expression is character-

istic; and the patient can be aroused from the coma by pressure upon the supra-orbital notch, by pinching the nose, or by the inhalation of ammonia.

Convulsions

A **convulsion** is a series of contractions involving the voluntary muscles of the major portion of the body. A **spasm** is a contraction or series of contractions involving a single muscle or a certain muscle group. Convulsions and spasms may be either tonic or clonic. A **tonic spasm** is a continuous contraction of a muscle or muscles, as in trismus. A **clonic spasm** is marked by alternating contractions and relaxations of the affected muscles, as is seen in spasmodic torticollis.

Convulsions are common in epilepsy, hysteria, tetanus, uremia, strychnine poisoning, eclampsia, hydrophobia, and lesions of the brain.

Epilepsy presents a striking example of both the tonic and clonic convulsions. The seizure is divided into two parts, the first being brief and of the tonic type, the second of the clonic type. Immediately preceding the attack the patient may have a premonitory symptom in the form of an aura, which may vary in different individuals but usually consists of an imaginary vapor arising from the region of the knees toward the head; when the vapor reaches the level of the head, the patient gives a scream, the head and eyes are turned to one side, and the patient passes into the tonic convulsion. In this the legs and arms are extended; the jaw is clenched; the hands are tightly closed; and the respiratory muscles are fixed, causing suboxidation and consequent cyanosis. This tonic condition may last about a minute; then there is relaxation, after which contractions and relaxations alternate. In this clonic part of the convulsion the muscles of the face, eyes, and jaw work convulsively; and the head and extremities jerk rhythmically. The action of the jaws may be such as to bite the tongue, causing the foam which forms in the mouth to be bloodstained.

There may be incontinence of the urine and involuntary movements of the bowels; after two or three minutes' duration the patient passes into the deep epileptic coma.

Although tonic and clonic convulsions may occur in other diseases, the mode and manner of onset and the course of the convulsion will differ according to the disease in which it is present.

Pallor

Pallor is a common derangement in the color of the skin, consisting of paleness or duskiness, varying with the pigmentation of the skin. Pallor may occur suddenly or gradually and it may be permanent or temporary.

Temporary pallor may be abrupt or gradual in its development. Temporary pallor develops suddenly in syncope and in many people under violent emotional strain. It may develop gradually when influenced by fluctuations in temperature and in chronic disease of the vascular system. In most instances the condition is readily corrected when adjustments are properly directed toward its cause.

Permanent pallor arises slowly and results from anemia. It may result from deficiency of hemoglobin, red cells, or loss of blood through hemorrhage. Permanent pallor is of longer duration than temporary pallor. It is found in the wasting diseases, primary anemia, hemorrhages, and following acute infections.

Cyanosis

Cyanosis is a bluish discoloration of the skin due to an excess amount of carbon dioxide in the blood and a lack of oxygen. It may be produced by any condition which inhibits normal respiration or the exchange of carbon dioxide for oxygen. Diseases which cause cyanosis may be grouped into four categories. First, those diseases which cause obstructive dyspnea and hinder the passage of air into the lungs. Examples are laryngismus, croup, and bronchial asthma. Second, diseases which prevent expansion of the lungs, such as pleurisy

with effusion, pneumothorax, hydrothorax, and paralysis of the diaphragm. Third, diseases which destroy the working surface of the lung, such as bilateral pneumonia and advanced pulmonary tuberculosis. Fourth, conditions which interfere with the systemic or pulmonary circulation of the blood. Examples are the congestive type of myocardial failure, thrombosis in the veins, large varicosities, or obstructions of superficial veins. Cyanosis is most readily detected in the mucous membrane of the lips, the oral membranes, and the fingernails. When severe, it is readily detected in the skin.

Jaundice or Icterus

Jaundice is a yellowish discoloration of the skin due to the presence of bile pigment. Normally bile pigment should be found only in the biliary apparatus and the intestines and is only found in the skin and fluids of the body when there is some obstruction to flow of bile from the liver into the intestine.

Jaundice may be of two kinds, mild or severe. **Mild** or **simple jaundice** is most commonly met with in temporary obstruction of the common bile duct by gallstones, catarrhal inflammation, or pressure by a growth of an adjacent organ. In such event the common duct is obstructed and the bile is absorbed by the hepatic vein or passes from the liver by osmosis through the fluids of the entire body, particles of the pigment becoming lodged in the skin and giving rise to the yellowish discoloration.

Severe or **grave jaundice** is of long standing and occurs when there is a permanent obstruction of the common bile duct, such as may be produced by impacted gallstones in the ampulla of Vater, carcinoma of the gallbladder or liver, chronic cholangitis, pressure by tumor of the head of the pancreas, tumor of the pylorus or of the duodenum, or any other growth or obstruction of the common bile duct.

In **simple icterus** the discoloration of the skin is slight, and

it may be unaccompanied by any other symptom; but, as a rule, there are constitutional disturbances. The appetite is lost, and there may be nausea and vomiting; the fecal matter is putty-like from the lack of bile; the urine is dark and contains bile pigment; the conjunctiva is yellowish—it is here the jaundice is first seen. The individual feels drowsy, is unable to carry on his occupation, loses flesh and strength, and may have a slight rise in the body temperature, a coated tongue, loss of taste, and an offensive odor with the breath.

Icterus gravis or severe jaundice occurs when there is an obstruction of the common duct of considerable standing, such obstruction being nearly complete. It is marked by a deep jaundice, first noticeable in the conjunctiva of the eye and later appearing in the skin of the entire body. There are severe constitutional disturbances, such as emaciation, weakness, anorexia, nausea, vomiting, constipation with attacks of fetid diarrhœa, urine containing bile pigment, and intense itching. There may or may not be a slight fever, and the pulse and respirations are slow. Li. P. and K. P. are adjusted in case of jaundice.

Skin Eruptions

Cutaneous or subcutaneous hemorrhages may occur as small spots called petechiæ or in large areas called ecchymoses. This occurs as an eruptive symptom in cerebrospinal meningitis and dengue and is also commonly found in scurvy, purpura, and hemophilia. It is produced because of a lack of motor function being expressed in the minute muscular fibers forming the blood vessel walls, permitting them to become relaxed, their fibers to separate and the blood to ooze out between the minute fibers.

Erythema is an evenly distributed redness of the skin due to a cutaneous hyperemia and is commonly found in erysipelas. Exanthem is the skin eruption in which there is an uneven redness of the skin of the body and is commonly found in the exanthemata. The eruptions of the exanthemata are spoken of

as macular, papular, vesicular, pustular, and petechial, the latter being previously described.

A **macule** is an area of discoloration without elevation or depression. It may be any color, shape, or size.

Macules which occur in the eruptive fevers are red in color and slightly elevated above the level of the skin due to hyperemia. They measure from two to four millimeters in diameter, may appear upon any skin surface, and may be distributed sparsely or densely. They are the characteristic eruption of measles.

A **papule** is a rounded or oval hard elevation of the skin and during its early appearance has a feeling like fine shot beneath the skin. It is usually reddish in color after becoming fully developed. All pimples could be classed as papules. It is the characteristic eruption in the first stage of variola.

A **vesicle** is a slight elevation of the skin, containing a clear fluid or serum. It usually follows the papular stage of an eruption and is found in the second stage of smallpox.

A **pustule** is an elevation of the skin, containing pus, and it often follows the vesicular stage in an eruption. It is produced by suppuration of the serum that is contained in the vesicle, giving it a smoky or cloudy appearance. It is found in the third stage of smallpox.

A **herpic** eruption consists of a series of minute vesicles situated upon a reddened and hardened base and attended by a burning or smarting pain. When occurring on the lips, it is called herpes labialis. When occurring on the nose, it is called herpes nasi.

Furuncles or **boils** may be classed as a form of cutaneous eruption. They are circumscribed areas of suppuration in the subcutaneous tissue and usually involve one or more of the sebaceous glands. At the onset they are red in color, but as soon as suppuration has occurred they become yellowish-white.

Dropsy

Dropsy is a general term that is used in connection with any general or local condition in which there is an excessive or abnormal accumulation of watery fluid in a cavity of the body, or where there is an infiltration of such fluid in the tissues of a part of the body. When dropsy is localized in one part of the body, such as an extremity, it is called edema. When edema is general, involving the entire body, it is called anasarca or general dropsy. When dropsy affects single cavities, it is given a different name according to the cavity affected. When there is an accumulation of a serous or watery fluid in the pericardium, it is called hydropericardium; when in the peritoneum, it is called hydroperitoneum; when in the thorax, it is called hydrothorax; and when in the brain, it is called hydrocephalus.

Anasarca or general dropsy is associated with edema, and in the great majority of instances dropsy of cavities is also associated with a local edema. The edema is readily recognized by pallor, swelling, and glossiness. If pressure be exerted with the tip of the finger over a hard or bony surface, pitting will occur. This latter symptom alone is sufficient for the recognition of edema. Edema may occur in connection with a great many different pathological conditions.

General dropsy is usually caused by some forms of nephritis or dilatation of the heart. In parenchymatous nephritis the secretion of urine is diminished; hence, if the intake of fluid exceeds the output, there is a gain in the watery content of the body. The distribution of this increased fluid is influenced by gravity; hence, edema is first observed in dependent parts of the body, especially where there is loose areolar tissue. It is common in these cases to note edema in the lower eyelids upon arising and in the lower extremities upon retiring. In due time the excess fluid accumulates in the cavities, and the condition is recognized as anasarca.

Cardiac edema develops in remote parts of the body when the heart muscle begins to fail. Myocardial failure may be associated with valvular defects but is not dependent upon them. Cardiac edema occurs when the force produced by the heart's action is insufficient to overcome the resistance offered by gravity to the return of blood through the veins. Cardiac edema is first noticed in dependent parts of the body.

Local edema may be produced by pressure upon any of the vessels draining the part. Large goiters, tumors in the neck, and aneurysm may obstruct the superior vena cava or some of its tributaries, thereby causing edema in the face, neck, or arms. Abdominal or pelvic tumors may press upon the inferior vena cava or its tributaries, causing edema in the lower half of the body. Phlebitis, thrombosis, and varicose veins offer obstruction to drainage through the affected veins, causing edema. Any obstruction of lymphatics causes a retention of the lymph in the tissues, which is a less common variety of edema known as lymphedema.

Cutaneous emphysema is a rare condition in which there is an accumulation of gas beneath the skin and in some instances may simulate dropsy or edema. It can be easily differentiated from edema because of the fact that the swelling does not pit upon pressure. The depressed skin follows the finger and assumes its former shape as soon as pressure is removed. There may be a crackling sound produced when the gas is forced through the subcutaneous tissue. This most frequently occurs in connection with emphysema of the lungs where an air cell is ruptured and the air escapes along the trachea, forming a small tumor above the clavicle.

Symptoms Pertaining to the Digestive Tract

Anorexia is a decrease or total loss of the appetite for food. It is commonly encountered in the febrile diseases and diseases of the stomach. In such conditions it is not wise to force eating, as the appetite alone is the best guide. In fever the

chlorosis = disease of young girls entering puberty.

metabolic rate is increased, and food beyond that which supplies the nutritive needs of the body furnishes fuel to increase the temperature further. When the organs of digestion are in a diseased state, their ability to prepare food for absorption is limited. Dietetic care should be observed to avoid further damage to the tissues and yet supply the body with the needed sustenance.

Bulimia is an abnormal hunger or craving for food and is observed in the stage of convalescence in the acute febrile diseases, in which anorexia has predominated for a long time. After the restoration of the body to health the body finds its need for food; the stomach is able to meet this demand in being able to digest the food; hence hunger prevails. Bulimia is a cardinal symptom of diabetes mellitus.

Pica is a craving for articles which are not food and which may be injurious to the body if eaten. It is most commonly seen in cases of insanity and idiocy. Occasionally it is present to a slight extent in pregnancy and chlorosis. In the latter there is often a craving for slate pencils, chalk, etc.

Excessive **thirst** is common in diseases attended by an overexcretion of fluid from the body either through the bowels or kidneys. It is found in diabetes, diarrhœa, cholera infantum, gastritis, xerostomia, and all the febrile diseases except typhoid.

Vomiting is the sudden expulsion of the contents of the stomach and is usually preceded by nausea. Vomiting is an adaptive symptom and occurs when any substance or substances are in the stomach which it is incapable of digesting or which, if digested, will be injurious to the human economy. In vomiting there is a deep inspiration, the glottis closes, the cardiac end of the stomach opens by a contraction of the longitudinal fibres, and the forcible expiratory contraction of the abdominal muscles follows, which causes the stomach to be emptied.

Vomiting without the sensation of nausea is of cerebral origin and indicates impairment of the vomiting center.

Severe vomiting, which is very weakening to the patient, occurs in acute gastritis. After the contents of the stomach have been emptied, retching continues with an expulsion of a watery fluid and glairy mucus. In hypersecretion of gastric juice there is profuse vomiting of the gastric juice, which contains the normal .2 per cent HCl.

Bilious vomiting occurs when the pyloric valve permits the regurgitation of the bile from the intestine. It is commonly called **biliousness.**

When vomiting occurs periodically every two or three days at which time large quantities of partially digested food with an abundance of fluid is vomited, it indicates dilatation of the stomach. If such a vomitus be allowed to stand, it will separate into three layers. The upper layer will consist of a froth which has formed during the fermentation in the stomach, the middle layer will consist of fluid, and the lower layer will consist of the sediment and solid undigested food. Such vomitus has an offensive odor, indicating putrefaction.

Hematemesis is the vomiting of blood and occurs when there is perforation or rupture of a large vessel of the stomach or esophagus. Hematemesis differs from hemoptysis in that the blood is vomited, not raised by coughing; in that it is of a darker color; and in that it has an acid reaction because of being mixed with the gastric juice.

Hematemesis commonly occurs in connection with ulcer of the stomach, from trauma which causes rupture of gastric vessels, from swallowed blood, and from rupture of old varicosities, which seldom occurs.

If a small hemorrhage should occur into the stomach, the blood will not be vomited immediately but may remain in the stomach and be acted upon by the digestive juices. It becomes dark in color and is called melena or coffee-ground vomit.

Coffee-ground vomit or **melena** is common in and characteristic of gastric cancer. It may also occur in gastric ulcer, chronic gastritis, yellow fever, atrophic cirrhosis of the liver, and Banti's disease.

Fecal vomiting is a pathognomonic symptom of intestinal obstruction. It is preceded by emptying of the contents of the stomach and then the vomiting of bile having a fecal odor; finally the vomiting of the fecal matter occurs.

Pus in the vomit indicates the presence of suppuration in the mucous membrane of the stomach or the perforation of the stomach wall by an abscess, its pus being discharged into the stomach.

Costiveness is a sluggishness of the bowels resulting from a lack of the normal secretions which give the feces its normal fluidity. Costiveness may be caused by nerve interferences which diminish secretions of the alimentary tract. Dehydration of the body produced by fever or polyuria will deprive it of its normal fluid content; as a consequence, all secretions are inhibited, including those of the alimentary tract.

Constipation is a sluggishness of the bowel resulting from deficient peristaltic motion, or it is a condition resulting from a lack of motor tonicity in the muscular fibers of the intestine. Constipation proper is always caused by a local subluxation in the lumbar region. The term constipation is, however, commonly but wrongly used to include both costiveness and constipation. Constipation is a common symptom in various forms of paralysis and in individuals who have by prolonged use of laxatives overstimulated the activity of the bowels. Obstructive constipation occurs in any mechanical obstruction to the descent of the feces.

Diarrhoea

Diarrhœa is an increased frequency and an abnormal fluidity of the stool, in which there is either increased action of the nervous mechanism of the intestines or increased secretion into the intestinal tract.

Diarrhœa is a symptom rather than a diseased condition and is most commonly found in affections of the intestinal tract in which there is an abnormal increase in the amount of

intestinal secretions. It may also be found in abnormal conditions of the liver, pancreas, stomach, or kidneys and a few diseases of the nervous system in which there is no indication of disturbances of the digestive system other than the diarrhœa.

The character of the stool will vary according to the condition producing the diarrhœa. It is a common symptom of enteritis, and in this affection the exudation from the mucous membrane is very profuse and tends to flush the bowels, giving the stool a mucous or mucopurulent consistency.

In cholera infantum the stools are large in quantity and of a serous consistency, the purging continuing almost constantly.

A thick **mucous** stool which is streaked with blood and evacuated with much straining and tenesmus is characteristic of acute dysentery; and if the dysentery becomes chronic, the stool may remain of the same consistency but will decrease in frequency.

A green stool containing a large quantity of undigested bile indicates a partial obstruction of the common bile duct, usually by a stone in the ampulla of Vater, which has a ball valve action.

A stool containing undigested fat is indicative of disease of the pancreas or obstruction of its duct; the fat is not emulsified and acts as a lubricant, flushing the bowels.

A **black** stool containing deoxygenated blood indicates hemorrhage of the bowels, the blood being altered by the digestive fluids. This may occur in peptic ulcer or carcinoma of the digestive tract.

Clay-colored stools indicate the absence of bile and are found in those conditions wherein the bile duct is obstructed; the bile is soon absorbed, giving rise to jaundice. Bile is the normal antiseptic of the intestines; and when it is absent, the fecal matter is often in a state of putrefaction.

Shreds of membrane consisting of transformed mucus are found in the stool in cases of diphtheric enteritis or in mucus colic and indicate an inflammation of the mucus membrane.

Abnormalities of Urination

Dysuria is commonly known as painful or difficult urination and occurs in abnormal conditions of the bladder or urethra, in which the mucous membrane is inflamed, the opening obstructed, or the organ pressed upon by a prolapsed viscus. It may also occur when the urinary system is normal, but the urine is highly concentrated and highly acid; the pain in such cases is produced by the irritation of the acid urine upon the delicate mucous membrane of the bladder and urethra.

In gonorrhea the mucous membrane is inflamed, red, and swollen; the lumen of the urethra is decreased; and the acid urine causes pain when coming in contact with the inflamed membrane. Dysuria is common in cystitis, cancer of the bladder, enlarged prostate gland, adhesions which prevent the entire collapse of the bladder, cystic calculi, and neuralgia of the bladder.

Difficult or slow urination is found in those diseases wherein the lumen of the urethra is diminished in size, or in which the muscular walls of the bladder or abdomen have lost their normal tonicity and are unable to force the urine from the bladder. This also is present in enlargement of the prostate gland, as it compresses the urethra near the neck of the bladder.

Polyuria occurs in those diseases attended with great thirst, common examples of which are diabetes and interstitial nephritis. Frequent urination is also found in those conditions responsible for dysuria, especially where the mucous membrane is easily irritated by highly concentrated urine. Dribbling of urine is not necessarily a form of polyuria but is rather a condition of incontinence of urine.

Incontinence of urine is the inability to control the passage of urine from the urinary bladder through the urethra. It

occurs when the sphincter muscle is unable to close the urethral orifice. Incontinence of urine may also occur in states of coma or unconsciousness, in which the volition is dulled or dormant, the act occurring adaptively without the assistance of the will.

Retention of urine is an abnormal condition in which the urine is normally secreted by the kidneys but is retained in the bladder. This may be caused by spasm of the sphincter or loss of sensation which frequently occurs in paralytic diseases. In cases of vesical anesthesia the brain fails to receive impressions from the bladder; therefore, the patient is unaware the bladder is distended. Urination is partly voluntary and partly involuntary; but since the patient is unaware of distention, there is no reason for expenditure of effort for the purpose of voiding.

any inflammatory disease can be classed as Bright's disease

Suppression of urine is due to dysfunction of the kidneys. Disease processes which inhibit their functioning cause the end products of metabolism to be retained in the blood stream. This leads to renal edema and ultimately uremia.

Nocturnal Enuresis

Nocturnal enuresis is the involuntary voiding of urine during the night. It is most common during childhood but may continue until puberty or thereafter.

It is quite commonly found in children having nasal obstruction as a consequence of adenoids or engorgement of the turbinated bodies or these conditions in conjunction with enlargement of the tonsils. The fact that the urine is retained in the bladder during the daytime indicates there is no impairment of the sphincter vesicæ muscle. When respiration is impaired from any cause, the blood is not thoroughly oxygenated, and much of the retained carbon dioxide is secreted in the urine. Carbon dioxide in the urine desensitizes the sensory nerves of the bladder so that the child is not awakened during sleep when voiding of the urine becomes necessary. The vol-

Most common cause of nocturnal Enuresis bed wetting is adenoids

untary portion of the act of urination is, therefore, absent while the involuntary part of the act takes place.

Adjustments in the cervical region which will normalize the respirations are of first importance. In addition lumbar adjustments which relieve pressure upon sensory nerves of the bladder are also of value. Restriction of the intake of liquid before retiring and the avoidance of extreme fatigue are very beneficial in overcoming this condition after it has become a habit.

Important Symptom Groups

Coma is the most profound state of unconsciousness and is marked by stertorous respiration, slow pulse, insensitive cornea, dilated or contracted pupils, failure of the cornea or pupil to respond to light, and expiratory puffing of the cheeks and lips. The various forms of coma have previously been described in which the characteristic symptoms of each form are mentioned. The above symptoms are common to all forms with slight variations.

Dyspnœa is more commonly known as difficult breathing and is characterized by a sense of thoracic discomfort or a sense of constriction in the chest; the respiratory rate is increased; the mouth is open; the nostrils are dilated; the face is cyanosed; speech is difficult; the skin may be cool; and there may be orthopnœa. There are variations in form and severity.

Fever is a condition in which the body temperature attains 99.5 degrees or over. All fever or feverish conditions are attended by a preceding sensation of chilliness or by a chill with rigors, an increase in the pulse and respiratory rate, increased thirst, loss of appetite, headache, backache, weakness, costiveness of the bowels, and scanty highly colored urine which contains an overabundance of solids. Sometimes there are nausea, vomiting, and delirium, the latter depending upon the height of the temperature. The adjustment for simple fever is C. P. and K. P.

for every degree rise in temperature there is increase of 5 heart beats.
at 108° temp permanent damage is done to the nervous system.

Internal hemorrhage is sometimes difficult to recognize, but usually the blood makes its appearance at some orifice of the body, such as the mouth, nose, ears, rectum, vagina, or a perforating wound.

Internal hemorrhage may begin with pain which is localized at the point of hemorrhage. There is a sudden drop in body temperature, a pallor of the skin, an anxious facial expression, and a fear of impending danger; the surface of the body is moist and cool; the respirations are short, shallow, and jerky, denoting air starvation; the pulse is rapid, small, and feeble and becomes thready as the collapse progresses. If during the course of a febrile disease the temperature drops suddenly to 95 degrees, it strongly suggests the existence of internal hemorrhage. When internal hemorrhages are large, they may prove fatal; when smaller and detected by the symptoms of collapse, the cause of the hemorrhage may be removed. Rupture of an aneurysm or the heart itself is a cause of fatal internal hemorrhage. Less severe causes are ulceration of the intestines, peptic ulcer, typhoid, ectopic gestation, tuberculosis, and carcinoma.

Shock or collapse is a condition of prostration of sudden development characterized by circulatory failure. There are cutaneous ischemia and visceral engorgement which are due to loss of control of the circulatory mechanism. The term collapse is commonly applied to this state when it develops in the course of an illness; while the term shock is applied when the condition arises as the result of trauma or surgical intervention. The symptoms are pallor and clamminess of the skin, decreased blood pressure, feeble rapid pulse, shallow respirations, air hunger, anxiety, and sometimes unconsciousness.

Syncope is more commonly known as fainting and results from cerebral anemia. This cerebral anemia may be caused by a subluxation impinging the vasomotor nerves of the cerebral arterioles, or by an H. P. subluxation, which interferes with the action of the heart. Fainting is marked by pallor of the

subsultus tendinum = involuntary twitching of muscles

carphologia = a picking of bed clothes during fever

face, quiet expression, imperceptible respiration and pulse, dilated pupils which are sensitive to light; and it is rarely fatal. The duration of fainting is short, but its effect may be weakening for some time.

Hectic fever is a name applied to the characteristic fever of suppurative tuberculosis. Hectic fever is characterized by pallor of the face with a circumscribed redness of the cheek, bright eyes, pearly sclera, clear mind, rapid pulse, rapid respiration, persistent anorexia, and a fever appearing in the afternoon and terminating during the night or early morning by crisis with profuse sweating. This is the characteristic fever of tuberculosis.

The typhoid status is a state, or condition, of great prostration in which the temperature is greatly elevated. It is commonly found in typhoid fever, from which it gets its name, but is by no means confined to this disease. In the typhoid state there are delirium or coma, a dry dark-coated tongue, sordes on the teeth, subsultus tendinum, carphologia, extreme prostration or weakness, and a high fever. The typhoid state is considered as a grave symptom and is unfavorable to recovery. It may occur in any of the high fevers, pyemia, abscesses, and endocarditis.

Indications of Abnormalities of the Face and Head

Hydrocephalus or dropsy of the brain is marked by a large globular head. At birth the normal head is about 14 inches in circumference, and at one year of age it measures 18 inches in circumference. In hydrocephalus the circumference is much greater than the normal. The anterior fontanel is wide and bulging and is greatly delayed in closing, the sutures are wide and furrowed, the face appears small in comparison with the enlarged head, and there may be strabismus.

The head of rachitis is sometimes mistaken for that of hydrocephalus, but in rickets the head is of square shape, the vertex is flattened; the caput quadratum is formed by the

(4) signs as Graves disease. — Malignant condition
1. Enlarged thyroid or goiter
2. pertrued eye balls.
3. tachocardia = rapid heart.
4. tremors
5. High B.M.R.

proliferation of the frontal and parietal eminences; the fontanels are delayed in closing but are depressed and not bulging; and there are alterations in the other skeletal bones.

Cretinism is a state of idiocy or imbecility due to failure of the thyroid gland to function. The head is large and of irregular shape, the fontanels remain open as late as the tenth year, the face is broad and flat, the nose is broad and negroid, the eyes are situated wide apart, the mouth is open, and the tongue protrudes.

Hippocratic countenance is a facial expression of extreme anxiety; the upper teeth are uncovered; the respiration is quickened and of the superior costal type; and the abdominal muscles are fixed. This is characteristic of acute diffuse peritonitis and cholera.

Graves disease
perrys disease
old terminology

In **exophthalmic goiter** there is a characteristic facial expression due to the protrusion of the eyeballs. Often the lids are incapable of covering the eyeballs. The mobility of the eye is impaired, interfering with the vision of moving objects.

Paralysis agitans has a peculiar facial expression known as **Parkinson's mask.** In this there is no change in the facial expression with a change of emotion. Tremor is frequently observed in the lower lips, causing the patient to drool.

A puffy face with bag-like swelling beneath the lower eyelid and a sallow color is indicative of renal disease. This is especially true when there is edema in the lower extremities and albumin in the urine.

Mouth breathing occurs when there is any obstruction to the passage of air through the nose or the nasopharynx. It is commonly encountered in adenoids or nasal polyppolypi.

Spasmodic torticollis is also known as the clonic form of torticollis. It is marked by a spasmodic jerking of the head toward one side, the face being rotated toward the opposite shoulder and chin raised. In some cases the shoulder is elevated when the head is drawn down. These movements are increased in frequency and force upon excitement.

The **Argyll Robertson pupil** is a condition of the eye in which there are accommodation changes to distance but no pupillary change to variations in the amount of light. As a rule, the pupil is in a state of persistent myosis. The condition results from damage to the ciliospinal center by organic disease of the spinal cord.

Ptosis is a drooping of the eyelid and results from atony of the levator palpebræ muscle. Ptosis may be unilateral or bilateral. When unilateral it is usually caused by edema of the upper lid or weakness of the levator muscle; when bilateral it may result from congenital malformation or extreme exhaustion, such as is encountered in advanced anemia.

Strabismus is more commonly known as cross-eye and is the inability to bring the visual axes to bear upon one point at the same time. It may affect one or both eyes and is due to a loss of tone of one ore more of the muscles of the eyeball. It may be caused by an upper cervical subluxation. If the eyeball is turned toward the external angle of the orbit, it is known as **divergent** or external strabismus; if the eyeball is turned toward the nose, it is called internal or **convergent** strabismus.

Diplopia or double vision results when the visual axes are not properly adjusted to each other, so that the image of the object observed falls on two different portions of the retina of each eye.

When both eyes are turned toward one side and the patient is unable to voluntarily change their position, it is termed **conjugate deviation.** Such a condition might result from a paralysis of the internal rectus muscle of one eye and the external rectus of the other eye or from some structural change in the center in the brain as in apoplexy or tumor.

Nasal Discharges

Discharges from the nose may be watery, mucous, mucopurulent, purulent or bloody. The former three are usually non-offensive, and the latter two may be offensive.

Nasal discharge

Watery discharges may be inflammatory or noninflammatory. When noninflammatory the nature of the discharge is not altered by time. Examples of noninflammatory watery discharges are to be found in hay fever, weeping, irritants in the eye, or the inhalation of irritating substances. Acute inflammation of the nasal membranes causes engorgement of the turbinated bodies and a watery discharge from the blood vessels. In two or three days this discharge becomes **mucous** in character. By the fifth day the mucus is opaque and mixed with pus cells; it is then said to be **mucopurulent.** When the discharge is composed mainly of pus, it is said to be **purulent.**

If the discharge has a very fetid odor and consists of offensive green crusts, it is indicative of atrophic rhinitis, syphilitic rhinitis, or necrosis of the nasal septum and is known as **ozena.**

A bloody discharge may be either offensive or nonoffensive, according to the condition from which it is derived. If the discharges consists of pure blood, as in epistaxis, it is nonoffensive and results from a hemorrhage of the nasal capillaries. If the discharge contains pus which is streaked with blood, it is usually offensive, the hemorrhage being the result of an erosion of the small vessels in the affected mucous membrane.

Often in diseases having an offensive discharge the olfactory cells are destroyed and the sense of smell is lost.

The Mouth and Speech

The mouth and lips are examined for objective symptoms of many diseases. The mucous membrane of the lips is thin, hence pallor and cyanosis are best seen here. Cyanosis indicates suboxygenation of the blood, while pallor indicates a condition of anemia.

Kopilk's spots are small red spots with a bluish-white center which appear upon the inner surface of the lips and cheeks during the initial stage of measles. They disappear upon the

appearance of the cutaneous eruption. Many authorities say the finding of these spots is pathognomonic of measles.

Herpes labialis, more commonly known as cold sores, are found upon the lips in respiratory catarrah, fever and disorders of digestion. They are a symptom of considerable importance in lobar pneumonia, occurring in about ninety per cent of the cases.

Unilateral deviation of the mouth results from unilateral paralysis of the face. It may be caused by Bell's palsy or intracranial apoplexy. The angle of the mouth is drawn toward the unaffected side of the face. Mastication of food and speech are greatly impaired.

The **chancre** of syphilis may appear upon the lips. It begins as a hard elevation in the center of which an ulcer develops. The lymph nodes lying in the path of the lymphatics becomes painlessly enlarged and hard. Cases having a suspected chancre should receive necessary laboratory examinations to decide the issue.

Screw-driver teeth appear late, or the child may be born with these teeth already erupted. Upon eruption the upper central incisors appear unusually large and are widely separated. They have a broad base and become narrow toward the edge. The edge has a single large notch. Corners of the teeth tend to crumble, and in due time the notch will disappear. Screw-driver teeth are also known as **Hutchinson's teeth.**

Aphonia is a complete loss of voice. **Dysphonia** is a partial loss of voice, commonly called hoarseness. Both conditions arise from varying degrees of edema of the larynx. Moderate edema produces dysphonia, whereas a marked edema may produce aphonia. These symptoms are encountered in common colds and specific inflammations of the larynx.

Anarthria is the inability to articulate sound. When the lips cannot be properly used, there will be anarthria of the labials, such as "m," "p," or "b." When the tongue cannot be used, there will be anarthria of the linguals, such as "l," "t," or "d."

Paresis = last stage of syphilis,

When the palate muscles cannot be properly used, the patient will have difficulty in using the gutturals, such as the hard sound of "g," "k," or "c." Muscles employed in the act of speech may become paralyzed or may be rendered incapable of use by inflammation or injury.

Scanning speech is a condition in which words are spoken slowly and each syllable is accented. It is a late symptom of multiple sclerosis and paresis.

Aphasia is the inability to produce or comprehend speech, either written or spoken. Aphasia may be motor or sensory. Motor aphasia is a condition in which the individual understands what has been said and is capable of forming an intelligent reply but is unable to recall the muscular movements of the organs of speech necessary to express his thought. Sensory aphasia may affect any of the special sense organs, usually the auditory and visual senses. Visual aphasia would, then, be a condition in which the patient can see but does not understand anything that he perceives through his eyes. Auditory aphasia is a condition in which the patient hears but does not comprehend anything that he hears, as if listening to a foreign language.

Apraxia is closely associated with aphasia and is the inability to recognize or understand the nature and use of objects or the identity of individuals. There may be as many kinds of apraxia as there are kinds of sensation, among which are mind deafness, mind blindness, mind anosmia, and mind ageusia.

The majority of cases of aphasia and apraxia which are not symptoms of some disease are congenital in their origin.

Cough

Cough is a sudden involuntary expulsion of air from the lungs due to irritation of the larynx, trachea, bronchi, or lungs and is classified as laryngeal, bronchial, or lung, depending

anaathemia Large spoat of light color usually red.

upon the site of irritation. Clinically cough is also classified as dry, loose, paroxysmal, brassy or metallic, and suppressed.

Laryngeal Cough is usually of the brassy or metallic type. It occurs in diseases of the larynx, especially those in which there is edema of the vocal cords. It is the characteristic cough of laryngitis, croup, and laryngeal diphtheria.

Bronchial Cough is a harsh and forceful expulsion of air when irritation exists in the trachea or bronchi. It is preceded by a tickle in the throat and accompanied by constriction in the chest. There may be difficulty in breathing. It is the typical cough accompanying the common cold.

Lung Cough results from irritation in the lung or pleura. It is deep-seated and may be great or slight in volume. In early pulmonary tuberculosis it is said to be dry and hacking, while in pleurisy, it is deep, forceful, and nonproductive. In advanced tuberculosis and pneumonia undergoing resolution it is of the productive variety.

A **dry** cough is one in which there is little or no expectoration and may be accompanied by the expulsion of a pellet of mucus. A dry cough is found in the first stage of bronchitis, tuberculosis, asthma, whooping cough, influenza, or irritation of the respiratory mucous membrane by dust or irritating substances.

A **loose or productive** cough is one in which there is profuse expectoration of exudate. It is found in the advanced stages of all inflammatory diseases of the respiratory mucous membrane, especially so in bronchitis, pneumonia, whooping cough, and tuberculosis.

A **paroxysmal** cough may be either dry or loose and is one that occurs at regular or irregular intervals. It is characteristic of whooping cough and bronchiectasis. Attacks of coughing may be induced by physical or psychic influences. A child with whooping cough may develop an attack upon a change in temperature or upon hearing or seeing another child in an attack.

asthma – small pieces of sputum.

A **brassy or metallic** cough always originates from the larynx and is commonly seen in croup, laryngeal diphtheria, and laryngitis.

A **suppressed** cough may be either dry or loose. Cough is suppressed whenever respiration or the act of coughing is painful or exhausting. It is a common symptom of pleurisy, peritonitis, appendicitis, and muscular rheumatism.

Expectoration

The examination of the sputum is made to determine its composition, color, odor, and quality. Sputum is usually scanty in dry inflammations of the bronchial tubes, pleura, larynx and in asthma. Sputum is abundant in chronic inflammation of the bronchial tubes, lungs, and larynx.

Watery or serous sputum is found in the first stage of congestion of the lungs, bronchitis, bronchial pneumonia, and emphysema. This may also be frothy because of containing small air bubbles and may resemble water made frothy with soap.

Viscid sputum is thick, sticky, and gelatinous, adhering to the retainer; and if the latter be inverted, the sputum will still adhere to it. Viscid sputum is commonly found in pneumonia, fibrinous bronchitis, and tonsillitis.

Mucous sputum is clear and rather thick, resembling the white of an egg. It may or may not be viscid and is found in pneumonia, tuberculosis, bronchitis, and whooping cough.

Mucopurulent sputum is found in the same disease as mucous sputum but indicates a more advanced stage of inflammation. It is of a yellowish-white color and is less viscid than mucous sputum. Pus cells cause an opacity of the sputum. It is common in bronchitis, pneumonia, and tuberculosis.

indicates a very severe condition →

Purulent sputum is composed chiefly of pus suspended in mucus and indicates suppuration in the bronchi, lungs, or

When offensive frothy - contains air bubbles

pleura. It is a symptom of putrid bronchitis, abscess, and gangrene of the lungs or empyema with a perforation into a bronchial tube.

Rusty sputum may be mucous, mucopurulent, or viscid and is of a rusty-red color, which it receives from the blood with which it is mixed. In the early stages this sputum may be bright red; but after the blood leaves the vessel, it loses its oxygen and becomes a dark, rusty color. It is a very common symptom of lobar pneumonia and tuberculosis. If this rusty sputum is very dark and profuse, it is called prune juice sputum.

Yellow or green sputum is nearly always purulent and indicates abscess or suppurative inflammation of the lungs. It has an offensive odor and consists of destroyed lung tissue and pus.

Hemoptysis is the expectoration of a considerable quantity of pure blood and indicates a hemorrhage of a pulmonary or bronchial vessel. This is a common occurrence in tuberculosis where there is an erosion of the blood vessel walls; but it also occurs in perforation of the lung, abscess, gangrene, and cancer. It is necessary to distinguish between hemoptysis and hematemesis. In hemoptysis the blood may be raised by coughing or clearing the throat, but occasionally it flows directly into the mouth without any physical effort. The blood is of a bright red color, is neutral in reaction, and is usually frothy. Hematemesis is produced upon the act of vomiting. The dark red color of this blood is caused by loss of its oxygen. It is acid in reaction due to an admixture with gastric juice.

The Spinal Column

The spinal column is examined for curvatures, ankyloses, exostoses, subluxations, and other deformities.

A posterior curvature of the spine is called a **kyphosis**; a lateral curvature of the spine is called a **scoliosis**; and an an-

terior curvature of the spine is called a **lordosis.** The significance of spinal curvatures is too great to be considered here, but disease conditions of which they are symptomatic will be mentioned.

Kyphosis is an abnormal bending of the spine in which the convexity is directed toward the posterior. It is permanent in character due to a degree of fixation. Kyphoses often develop in young people because of improper posture, creating fatigue of spinal muscles. Other cases result from the habitual assumption of a position that favors the development of this curvature. The asthmatic hump of asthma and emphysema involves but a few vertebrae in the lower cervical and upper dorsal area of the spine. Pott's disease tends to produce an acute angular kyphosis because of the destruction of the vertebral bodies by tuberculosis.

Scoliosis is a curvature of the spine in which the convexity extends laterally. The vertebral bodies in a scoliosis tend to rotate toward the side of convexity, and the condition is then called a **rotatory scoliosis.** Rotary scoliosis is a constant symptom in the chronic fibroid lung whether of tubercular or pneumonic origin. The damaged lung contracts and expands imperfectly; hence it will be found to be on the concave side of the curvature. The lung on the convex side of the curvature enlarges in all directions and becomes emphysematous.

Lumbar scolioses often result from inequality in the length of the legs which causes a tilting of the pelvis. Other scolioses result from rickets, muscular paralysis, and arthritis.

Lordosis is a curvature in which the convexity is directed toward the anterior. Lordosis is usually a postural defect, often being adaptive to a kyphosis. There are apparent lordoses in pregnancy, ascites, and large abdominal tumors. In such cases the forward bending occurs at the iliofemoral joints. In muscular paralyses and dystrophies curvatures result from weakness of the spinal muscles and an attempt to maintain equilibrium by holding the shoulders toward the posterior.

Ankylosis is a union of two or more vertebrae. It is usually brought about by an inflammatory process which damages the bone structure. Ankylosis may be suspected in the spine when palpation reveals the immobilization of vertebrae upon bending. Such cases should be X-rayed for positive identification of the ankylosis.

Exostosis is abnormal growth of bone upon bone. Occasionally exostoses develop upon the spinous and transverse processes of vertebrae. When present they limit the accuracy of vertebral palpation. More commonly exostoses develop upon the anterior or lateral aspects of the epiphyseal ring. Small projections from the ring are called **osteophytes** or **spicules.** Large developments of bone are recognized as exostoses. Exostoses from two adjacent bones upon uniting form an ankylosis.

A **vertebral subluxation** is a minute disrelationship existing between two adjacent vertebrae in which the articular processes remain in contact. A **vertebral dislocation** is a disrelationship existing between two adjacent vertebrae in which the articular processes have completely lost contact. Vertebrae are subluxated by trauma or by the force of muscular contraction. Changes occur in the adjacent intervertebral disks, ligaments, membranes, and muscles which produce some degree of fixation. The adjacent intervertebral foramina are altered in size, as a rule two of them becoming smaller than normal and the other two larger than normal. Spinal nerves or nerve roots are subjected to pressure at the smaller formina and are subjected to tension at the enlarged foramina. Pressure and tension both impair normal nerve function.

CHAPTER II

THE CONSTITUTIONAL DISEASES

Diseases of Metabolism

Gout

Definition.—Gout is a disturbance of metabolism characterized by attacks of inflammation in the joints and attended by deformity due to the deposit of urates. These deposits are also called tophi. They are most commonly composed of sodium urate. Tophi appear at the margin of joints, in the cartilage and skin of the ear, and sometimes in subcutaneous tissues.

Adjustment.—The most important adjustment in cases of gout is the lower dorsal area of the spine which innervates the kidney. Since the function of the kidney is influenced by the vagus nerve, the upper cervical area should not be overlooked.

Several etiological factors may exist in gout, including excessive use of alcoholic liquors, overeating, poison by lead, and sometimes exposure; but in the main gouty patients consume large quantities of food, particularly foods rich in nucleoproteins. With impaired kidney action, urates derived from the nucleoproteins accumulate in the body and become deposited where the movement of body fluids is slow.

Pathology.—In acute attacks the affected joint becomes markedly swollen and red. The skin has a shiny, polished appearance. Large veins are engorged. White deposits of urates are found in the cartilage, synovial membrane, ligaments, and other fibrous tissues around the joint. Tophi also form in the pinna and skin of the ear and around joints. The adjacent bone becomes rarefied, indicating a loss of calcium. In chronic cases the joints are altered in shape and size and present a similar appearance to that of hypertrophic arthritis.

Symptoms.—The acute form begins suddenly during the night with intense pain in the great toe, chill, fever of 102 degrees or less, extreme restlessness, and insomnia. The toe is greatly swollen, very red, and tender; the surrounding skin is glossy, tense, and shiny. The pain diminishes upon constant movement and may entirely disappear after two or three hours to return the following night. The attacks may occur with regularity each night for five or ten days, after which there may be a long interval of rest. Individuals who have experienced previous attacks usually have prodromal symptoms, indicating the oncoming attack. These consist of drowsiness, constipation, palpitation of the heart, irritability of temper, scanty highly colored urine, and aching pains in the lower extremities.

Chronic gout results from many recurrences of acute attacks. The inflammation becomes chronic and causes a crystallization of sodium urate which is deposited in and around the joint, producing disability and deformity. Many joints may become involved finally, the inflammation spreading from the great toe to the other phalanges of the foot, then the ankle, knee, and upper extremities. The deposits of these tophi deform and produce ankylosis of the joints involved. Later in the disease there are deposits of the tophi in the cartilages of the ear, sternum, ribs, larynx; in the tendons of the muscles; and in the skin. Portions of the deposit may be exposed because of ulceration of the skin covering them. The blood vessels become hard and inelastic, thus increasing the peripheral resistance and inducing hypertrophy of the left ventricle. In addition to the above symptoms there may be gastric and intestinal symptoms of a severe type; vascular symptoms pertaining to the heart and blood vessels; and renal symptoms indicating disturbances in the function of the kidneys.

Gout can be distinguished from articular rheumatism in that the latter affects the larger joints, is not attended by the severe pain of gout, does not have the excessive hyperemia and venous congestion of gout, and usually has a fever that

is more severe than that of gout. In rheumatism the attack is not intermittent, and there is no deposit of tophi in the cartilage, tendons, and skin.

Arthritis deformans affects the small joints as does gout; but the attack is gradual, and the pain is present continuously, not being intermittent during the day as is the case in the onset of gout. The deformity in arthritis deformans consists in a softening of the bone and formation of false exostosis, not in the deposit of sodium urate.

Rheumatism

Definition.—Rheumatism is a constitutional disease characterized by redness, swelling, and pain in the joints and surrounding tissues. There are recurring attacks, especially associated with exposure, cold, and dampness.

ACUTE ARTICULAR RHEUMATISM and **inflammatory rheumatism** are frequently applied to acute rheumatic fever, a condition developing in connection with focal infections and often complicated by endocarditis.

CHRONIC ARTICULAR RHEUMATISM is sometimes applied to chronic arthritis; **atrophic arthritis, rheumatoid arthritis,** and **arthritis deformans** are synonyms. Gonorrheal rheumatism is a term sometimes applied to gonorrheal arthritis.

MUSCULAR RHEUMATISM was formerly applied to a variety of painful muscular conditions, including myositis and intermuscular fibrositis, both primary and secondary, and to acute conditions including lambago, pleurodynia, and torticollis.

In MYOSITIS there are congestion, edema, and hemorrhage in the fibrous tissues in and around the affected muscles. The connective tissue tends to proliferate and invade muscle fibers. In time this newly developed fibrous tissue contracts and forms a firm mass which may calcify or ossify developing true bone.

Symptoms.—There may be a history of injury, disease, or toxicity. The body temperature may be slightly elevated. There are often redness and swelling visible on the surface of the affected joints. Circumscribed tenderness is easily detected and traceable along the course of cutaneous nerves to the spine. Pain may be severe, especially upon attempted use of the affected muscle. In a few months the large mass feels firm and resistant. X-ray is useful in detecting deposits of bone or calcium.

FIBROSITIS is said to be primary when it is independent of other detectable disease. It is said to be secondary when it is preceded or accompanied by infections or toxic conditions.

*Pathology.—The*re is an infllammatory hyperplasia of fibrous tissue in the fasciæ, aponeuroses, tendons, or ligaments. Vascular exudate may develop in the fibrous tissue and produce temporary symptoms which recur at irregular intervals.

Fibrositis of the palmar tendons leads to Dupuytren's contracture which produces flexion of one or more fingers, the contractured tendon standing out prominently in the palm of the hand. Fibrositis of the spinal ligaments causes thickening of these ligaments and leads to rigidity of the spine. In such cases the X-ray fails to show bony changes.

Symptoms.—Most cases are of sudden onset with sharp pain in the affected area. Pain is increased upon movement that tends to stretch the fibrous tissue. Pain may occur in attacks for a few days or weeks. Cases which are chronic from the beginning have aching and stiffness in the affected muscles; this is increased upon activity. The affected muscles fatigue upon slight exercise, but persistence in exercising gives relief which the patient attributes to limbering-up exercises. Fatigue is persistent; but the pain varies with thermal changes, exertion and nervousness.

Most cases of pleurodynia result from posterior nerve root irritation in the dorsal spine caused by vertebral subluxation and the wedging of the intervertebral disks.

About 50% of torticollis is a motor reflex due to irritation in the lung or pleura. The stimulus inducing this reflex is the pathology in the lung or pleura. In most cases tenderness and contraction are discoverable upon proper spinal examination.

Other cases of torticollis may be caused by cervical subluxations irritating spinal nerve roots at the cervical foramina. These cases respond quickly to the proper cervical adjustment.

Lumbago means pain in the loins. It may affect any of the muscles in the lumbar area of the spine. The pain may be caused by a lumbosacral strain, sacroiliac strain, or by lumbar subluxations which cause irritation upon the lumbar nerve roots. Such cases respond readily to the proper corrective method. The lower lumbar nerve roots may be compressed by herniated nucleus pulposus from a lower lumbar intervertebral disk. These cases tend to become chronic, but at least 50% are correctable by proper spinal adjustment. The discovery of analgesic zones in the skin is of value in the detection of herniated disks. All suspected cases should be X-rayed.

Arthritis Deformans

Definition.—Arthritis deformans is a chronic disease of the joints characterized by changes in the cartilage and synovial membranes with periarticular formation of bone and great deformity.

Adjustment.—Adjustments should be directed to those parts of the spine related to organs of elimination. The middle and lower dorsal areas and the lumbar region are invariably involved in all cases.

Arthritis deformans is also known as **rheumatoid arthritis.** Exciting causes may be shock, fatigue, injury, infectious diseases, and exposure. The chief exciting cause is auto-intoxi-

Infectious agent streptococcus

cation. The source of the toxins is chiefly in the intestinal tract. The colon may be spastic at one point and atonic at other points. The mucosa of the colon may become engorged and absorb toxins which are later distributed throughout the body. Unbalanced diets consisting of large quantities of acid-forming foods coupled with poor elimination add fuel to the fire. Recovery depends upon three things: first, regular adjustments to restore normal function; second, predominance of alkaline-forming foods to reduce the bulk of metabolic ash; third, thorough cleansing of the morbid colon to reduce toxic absorption.

Pathology.—During the early stages the anatomical changes are largely limited to the soft tissues of the joint. The synovial membrane is congested and swollen; the quantity of synovial fluid is increased. Contractures cause the fingers to be deflated toward the ulnar side of the hand. As the disease progresses, the articular cartilage is disintegrated. Fibrous granulation tissues develop at the ends of the bones to bind the two articulating surfaces together. The cancellous bone becomes rarefied, indicating loss of calcium, possibly because of its having been combined with acid.

Symptoms.—There are an acute and a chronic form. The acute form begins with pain in the small joints, simulating acute rheumatism. The pain is intense and constant, but the swelling and hyperemia are slight. Many joints are affected at the same time; sometimes both upper and lower extremities are involved. The condition always affects the small joints but in time may also implicate the larger ones.

The chronic form is more common and is always symmetrical, involving both lower extremities or both upper extremities or possibly all four extremities. The peripheral joints become swollen and slightly red; this condition is attended with a moderate degree of pain which is subject to exacerbations at times. Small, bony growths form upon the ends of the bones as a result of epiphyseal proliferation and finally effect anky-

occurs under age of 40.

losis of the joint involved. The adjacent muscles are tense and undergo slight atrophy. The hands are deflected, and many of the fingers may be partially flexed. The skin is smooth and glossy, and the wrist is broad and flat. It is not uncommon to find small petechial spots or arthritic purpura beneath the skin. Finally larger joints may become involved with similar deformities and stiffness.

The monarticular form is so named because it affects only one joint and is more commonly found in elderly people. The pathological changes are the same as those described. The joint is finally ankylosed and made permanently stiff. The hip, shoulder, and knee joints are most frequently involved.

found in all types of arthritis

Heberden's nodes are nodular deformities affecting the distal phalanges in which there are bony growths upon the dorsal aspect of the joint, preventing it from being extended. These bony nodules can be palpated and are usually red, swollen, and slightly tender.

also called joint mice.

Hypertrophic Arthritis

Definition.—Hypertrophic arthritis is also known as **osteo-arthritis.** It is a degenerative disease of the bone characterized by hypertrophic changes occurring near but not upon the articular surfaces.

Adjustment.—Same as for arthritis deformans.

Pathology.—This condition is most common in advanced years of life. X-ray reveals a roughening of the bone surface near the articular surface. Changes most commonly occur in the hip, knee, and spine. Occasionally the smaller joints are also involved. The synovial membrane is not affected except in the most advanced stages. Spicules of bone grow out from the lips of the vertebral bodies and effect spinal ankylosis. In other joints there may also be atrophic changes of the normal bone and at the same time a hypertrophic development upon it or in the adjacent tendons or bursae. Particularly in the knee small tumors composed of cartilage form. They move

freely in the joint cavity and are called "joint mice." They may be in a position that greatly interferes with extension of the legs but at times offer no impairment to joint movements.

Symptoms.—The onset is very gradual with slight stiffness and discomfort at the beginning of exercise. In time there may be considerable pain in the affected joints, particularly if the joint is subjected to extreme degrees of movements. When the knee or hip is affected, there is invariably limping and in due time stiffness of the joint. When the spine is involved, there is some degree of spinal rigidity and limitation of movement. Patients of sedentary habits often have no pain, and the first information regarding the condition of the spine is revealed by X-ray. Those spinal cases which perform manual labor frequently have attacks of lumbago or spinal pain that extends into the upper dorsal and cervical region of the spine. Occasionally some ankyloses are broken, giving rise to acute pain.

The progress of the disease is very slow; many cases have but little pain. The condition does not appear to shorten life greatly.

Rickets

Definition.—Rickets is a disease of early life characterized by malnutrition, abnormality of the bones, and improper use of muscles.

Adjustment.—The adjustment should include upper cervical and middle and lower dorsal areas. Rickets may be caused by lack of vitamin D during that time in life when growth is rapid. It is highly essential that ingested food be properly digested and that all metabolic ash be properly eliminated. Rickets is most common in the temperate zones, and its greatest incidence occurs during the winter and spring months. In the frigid zones the inhabitants live chiefly upon fish whose fats store vitamin D; in the tropics the inhabitants live out-

doors and secure all needed vitamin D from the sun's rays. In the temperate zones vitamin D, if deficient, may be supplied by sunlight in summer and fish oil during the winter months. This would assure the body of all nutritional factors essential in preventing and overcoming rickets.

Pathology.—The structural changes occurring in rickets result from the failure of lime salts to be deposited in cartilage and newly formed bone. Early changes are observable near the articular ends of long bones, particularly along the epiphyseal plates. This unossified cartilage yields to the strain of the contracting muscles, thus making the zone of cartilage appear broader. Usually pointed spicules of bone project from the epiphyses toward the diaphysis. The ends of the bones may become soft and spongy with the development of irregular shaped nodules. A series of bony nodules forming upon the sternal end of the ribs is known as the **rachitic rosary.** The long bones may become curved due to weight or the strain of muscle pull. The bones of the skull may become abnormally thin in places; these areas may be indented by slight pressure. These cranial changes not only result from failure of calcium to be deposited but are thought also to result from its absorption. The condition is known as **craniotabes.** Spontaneous fractures occasionally occur at the junction of the head of the femur with its shaft and also at the upper end of the tibia.

Symptoms.—The symptoms of rachitis manifest themselves during the first year of life and begin with restlessness, irritability, and slight fever. The child cries a great deal, wakes frequently during the night, and has drenching sweats, especially around the head. The child fails to eat as formerly, therefore becomes thin and emaciated; the skin is pale; the fontanels fail to ossify and are depressed; and the sutures of the cranial bones are deep and furrowed. Detention is delayed, and the teeth that do appear are small and irregular in shape. The child becomes anemic; and though he may eat well, the food is not assimilated. The abdomen protrudes,

making the child potbellied; the face is thin and narrow; and the head appears to be greatly enlarged, but this is due to the abnormal shape, caput quadratum. The hair on the back of the head is worn off by the constant turning of the head from side to side, and the back of the skull becomes the site of craniotabes. The ribs become very nearly horizontal because of the bulging anteriorly of the chest, while the lower costal cartilages appear to be pressed backward. The legs and arms become deformed because of the softening. Talipes may occur in the feet; the calf muscles are thin and undergo a degree of atrophy and shortening; and the skin is moist and clammy. The nutrition of the entire body suffers, with the result that every bone may be deformed.

Harrison's groove is usually accentuated by an outward flaring of the lower ribs. The lumbar spine may become kyphotic. The tibia is often curved forward, producing an angular deformity—the saber shin. X-ray studies of the bones are valuable in detecting rachitis.

Diabetes Insipidus

Definition.—Diabetes insipidus is a constitutional disease characterized by polyuria and excessive thirst.

Etiology.—There are two forms known as the primary or idiopathic in which there is no discoverable pathology and the secondary or symptomatic in which there is discoverable pathology in the brain or visceral organs. This disease is most common during the first thirty years of life. It sometimes follows injury to the base of the skull, particularly to the pars intermedia of the pituitary body.

The spinal cause of diabetes insipidus will be found in the upper cervical or lower dorsal regions of the spine. When the pituitary is the seat of dysfunction, a condyle or atlas adjustment is most apt to be effective. When there is merely polyuria, a secretory neurosis of the kidney; the lower dorsal region of the spine is of greatest importance.

There is no pathology in the kidney other than a mild congestion with slight engorgement of the organ. This is believed to result from its overactivity rather than to be the cause of the excess function. The increased activity is believed to result from the action of the pituitary secretion.

Symptoms.—Polyuria is the cardinal symptom of diabetes insipidus. The amount of pale, slightly acid urine voided varies in patients; however, voiding of two or three gallon in twenty-four hours is not rare. The specific gravity is low, varying from 1.001 to 1.008. Chemical analysis shows the urine to be free from sugar, albumin, casts, and other acids or substances found when pathological conditions exist.

The body is in a state of dehydration; hence, the skin is dry and scaly, the mouth is dry, the bowels are costive, and the patient complains of great thirst and hunger. There may be aching pain over the kidneys, and usually there is a headache at the vertex of the skull. The patient tends to be irritable and has a poor memory. The eyes are weak.

Diabetes insipidus differs from diabetes mellitus in that the latter has urine of high specific gravity containing sugar, and the blood sugar is persistently elevated. Diabetes insipidus differs from chronic interstitial nephritis in that the latter is associated with high blood pressure, is most commonly found in patients after middle life, and has urine of low specific gravity containing albumin, casts, and kidney cells.

Diabetes Mellitus

Definition.—Diabetes mellitus is a disorder of metabolism characterized by glycosuria and hyperglycemia. The quantity of urine is increased and is of increased specific gravity.

Adjustment.—Three areas of the spine may be concerned with the cause of diabetes; they include upper cervical, middle dorsal, and lower dorsal areas. The vagus nerve is the activator of the secretory cells of the pancreas. When diabetes is a secretory neurosis, the condition will yield to upper cerv-

ical adjustments. Sympathetic nerves govern metabolism and, therefore, control the physical integrity of the pancreas. Should there be inflammatory or degenerative changes in the pancreas, the spinal cause will be found in the middle dorsal region. The lower dorsal region is involved in those cases having dysfunction of the adrenal glands. When the glucose tolerance of the kidney is diminished, the condition is spoken of as *renal diabetes;* lower dorsal adjustments will tend to increase the threshold of resistance in these cases.

Pathology.—There is no pathological change known to exist as a cause for diabetes. In children pathological changes are rarely found. In adults inflammatory and degenerative changes of the pancreas, particularly of the islands of Langerhans, occasionally are found. The degeneration may be hyaline, sclerotic, or pigmentary.

Symptoms.—Diabetes in adults is frequently preceded by emotional shock or injury. Many of the subjects developing the disease are overweight. The onset is usually insidious, and the course is usually chronic. In children, however, the onset may be sudden and the duration short. As a rule, there is an increase in the flow of urine; thirst is increased proportionately. The amount of urine voided in twenty-four hours may vary from normal to twenty or thirty pints. The urine is pale and clear and has a sweetish odor. The specific gravity is increased, varying from 1.025 to 1.045. Chemical analysis shows the presence of sugar in varying quantities. In advanced cases the urine contains acetone and diacetic acid. The presence of these acids denotes acidosis and heralds the approach of diabetic coma.

Weight and strength are gradually lost; this is due to undernourishment and dehydration, the latter being caused by polyuria. Diabetics complain of fatigue in a mild degree. It is an early symptom and tends to increase progressively with the disease.

Pruritis in the earlier stages may be limited to the genitals but in advanced cases becomes generalized. The skin is dry

25-30 % of congenital cataract is caused by diabetic pregnancy.

and scaly and when excoriated is readily infected and festers. In advanced diabetes constipation is the rule, the temper is irritable, sexual function is lost, the power to concentrate is impaired, and headaches are common.

The heart action may become irregular with lowered blood pressure. Often, however, there is hypertension with marked elevation of the blood pressure. Drowsiness is common after eating a hearty meal; it is an early symptom of acid intoxication.

Diabetic gangrene commonly develops in the lower extremities; it results from thickened vascular walls blocking the passage of blood. Arterial obstruction leads to dry gangrene which may have little or no pain. Often a digit is amputated by this process. Venous obstruction causes moist gangrene: the part is swollen, dark in color, and painful; usually an elevation of body temperatures accompanies this.

Impairment of vision may be due to the development of diabetic cataract or diabetic retinitis. Improvement of vision in such cases is dependent upon improvement of the diabetic condition.

Obesity

Definition.—Obesity is a disease of metabolism in which there is excessive accumulation of fat evenly distributed over the body.

Adjustment.—Spinal adjustments which influence the endocrine glands and the organs of elimination are of value. Dietetic regulations are necessary so that the intake of food is proportionate to the expenditure of energy.

Symptoms.—Obesity may be divided into two main types. The first type is associated with an increase in food, a decrease in body activity, or both. The second type is due to a disturbance in the function of one or more endocrine glands which reduces the rate of oxidation in the body. In both types the obesity is a result of more food being ingested than the body is oxidizing. Many obese people claim to be small eaters;

but if this is true, their rate of metabolism is below normal. Moderate obesity does not always have symptoms. More severe cases have difficult breathing and irritability of the heart. The abdomen tends to become pendulous, and the patient assumes a station that causes apparent lumbar lordosis. As a rule, the forward bending occurs at the hip joint rather than in the spine. The muscles tend to become soft and flabby, and the patient fatigues upon slight exertion. The bowels have a sluggish tendency. The skin is usually cool and moist. There may be enlargement of the heart, partly from accumulated fat and partly from hypertrophy. Extreme obese people are uncomfortable in a horizontal position; this is relieved by elevating the head and shoulders, which lessens pressure on the under side of the diaphragm. Obese people suffer with diseases of the heart, kidneys, and liver, suffering markedly from the effect of their corpulency; in these cases life is shortened. Acute diseases are serious in the obese; this is particularly true of pneumonia and kidney diseases.

Adiposis Dolorosa

Definition.—Adiposis dolorosa is a metabolistic disease characterized by the formation of fatty tumors which are preceded or attended by severe neuralgic pain.

Symptoms.—This is a rare disease and most frequently occurs in fat individuals. The patient gradually increases in size, and fatty tumors form over the entire body. These tumors are located deeply in the abdominal and thoracic cavities and superficially in the subcutaneous areolar tissue. They may vary in size from that of a pea to large tumors four or five inches in diameter. The fatty tumors do not appear upon the palms of the hands nor upon the soles of the feet and very rarely upon the face. Each tumor is attended with a severe burning pain which is so severe that it keeps the patient awake and serves as a differential symptom from multiple lipoma. Tenderness is also present to a marked degree while absent in lipoma.

CHAPTER III

THE ACUTE FEBRILE DISEASES

Body Temperature

Fever is a condition in which the body temperature is increased above normal and is attended by characteristic symptoms. The average normal body temperature is 98.6 degrees, yet normal temperatures have been known to vary between 99.5 and 97.2 degrees. The body temperature may be slightly increased by violent exercise in hot weather, mental exertion, and excitement. The most important change in normal temperature is that which occurs daily. Under normal conditions the body temperature is lowest in the morning about 6 A. M. and highest in the evening between 6 and 8 P. M. Daily variation is usually restricted to one degree, but the greatest difference considered compatible with health is 1.8 degrees.

There is a slight variation in the temperature of the body according to the location at which it is taken. The normal temperature in the axilla or groin is 98.4, mouth 98.6, rectum or vagina 99.5.

A temperature between 99 and 100 degrees is spoken of as feverishness; a temperature between 100 and 101 as slight fever, 101 to 103 moderate fever, a temperature between 104 and 105 as high fever; a fever of 106 or over is called hyperpyrexia. A fever is said to have three periods or stages—the first stage is known as the invasion or initial stage, during which time the temperature gradually rises; the second stage is called the adult stage, during which the fever reaches its height and during which the cardinal symptoms of the disease producing the fever will be manifest; the third stage is known as the decline or the sweat period, during which the temperature gradually drops until it becomes normal.

Fever may decline suddenly or gradually. When the tem-

perature falls gradually, the fever is said to terminate by lysis, as in typhoid, scarlatina, and bronchial pneumonia. When the temperature drops suddenly and is attended by profuse sweating, the fever is said to terminate by crisis as in pneumonia, measles, and malaria.

The **symptoms of a simple fever** are a hot dry skin, flushed face, dry mouth with excessive thirst, malaise, lassitude and languor, anorexia, nausea and vomiting, costiveness of the bowels, scanty highly colored urine, headache and backache, increased pulse rate, and quickened respiration. In cases of a high fever there may be cerebral symptoms of delirium, stupor, or coma and a suppression of the body secretions. As a rule, in fever when the temperature increases one degree, the pulse increases ten beats per minute. The increase in respiration rate is two to three per minute.

The daily decrease in the temperature is known as the **remission**; it generally occurs in the morning. The increase is known as the **exacerbation**; it usually occurs in the evening. When this order is reversed, the fever is said to be of the **inverse** type. Any temperature below 97.2 degrees is said to be **subnormal**, while a temperature above 106 degrees is known as **hyperpyrexia** and is a grave symptom.

Types of Fever

A **continued fever** is one in which the daily difference between the remission and the exacerbation is less than two degrees. It occurs in the majority of the febrile diseases, such as typhoid, typhus, and lobar pneumonia.

A **remittent fever** is one in which the daily difference between the remission and the exacerbation is more than two degrees, but at no time is the temperature within the normal range. It is the typical fever found in bronchopneumonia, rheumatic fever, advanced tuberculosis, and mild cases of suppuration.

An intermittent fever is one whose temperature reaches the normal or is subnormal at least once during 24 hours. It occurs in abscesses, acute endocarditis, pyemia, malaria, and tuberculosis. Intermittent fever begins with a period of chilliness or a chill which is followed by moderate or high fever. It terminates by crisis and is accompanied by profuse sweating.

A fever that returns several days after it has disappeared is said to be a recurrent or relapsing fever; while one in which there is no regular variation in its remissions or intermissions is said to be an irregular fever. Dengue and relapsing fever have a recurrent fever, and pyemia has a typical irregular fever.

Subnormal Temperature.—When the body temperature drops below 98 degrees, the temperature is said to be subnormal. It is of common occurrence immediately after the fall of fever by crisis and is also observed in shock and collapse. A subnormal morning temperature with a persistent rise during the afternoon is highly suggestive of tuberculosis. In valvular disease of the heart, myxedema, diabetes, cancer, and epilepsy a moderate per cent of the cases will show subnormal temperatures.

Care of Febrile Cases.—All cases of fever should be placed in bed. The room should be moderately warm, quiet, and well ventilated. The body should be sponged and kept clean at all times to permit the skin to function. Remember the skin is an important organ of elimination; and furthermore, 80 per cent of the heat dissipated from the body is given off through the skin. The dissipation of heat is much greater during perspiration. The patient should be nourished with milk, animal broths, and other nutritious foods in small quantities but at regular intervals. At no time should solids be given. The patient should be provided with plenty of fresh, pure, cold

water; and orangeade or lemonade may be given in liberal quantities. Orange juice and lemon juice are both nourishing and cleansing; and in addition they tend to neutralize acid excretions which are always increased during fever. The patient should be adjusted according to the spinal findings from one to four times per day, depending upon the nature of the case. The frequency of the adjustment must be determined by the Chiropractor, and his judgment will naturally be guided by his former teaching and past experiences.

Infection

The presence of bacteria in the human body does not constitute infection, nor does it indicate the existence of an infectious disease. Many types of bacteria are found in many organs of the body in perfectly healthy people. Colon Bacilli are found in the intestines; streptococci, staphylococci, and pneumococci are often found in the mouth and throat without the existence of a sore throat or even a cold. Before an infection takes place, the following requirements must be fulfilled: first, the bacteria must be pathogenic; second, they must be present in large numbers; third, they must possess a sufficient degree of virulence; fourth, they must enter the body by a path or avenue adapted to their requirements; fifth, they must find an environment suitable to their nutritional requirements; sixth, there must be lowered tissue resistance.

Bacteria are unicellular vegetative organisms and grow where they find available soil and suitable environment. When there is interference with nerve transmission, there is disturbed metabolism in the tissue supplied; this reduces cellular activity and permits the accumulation of metabolic waste, furnishing a suitable environment for the propagation of bacteria. Bacteria being live organisms, manifest signs of life; they, therefore, assimilate, reproduce, and excrete. The excreta of bacteria is known as an exotoxin. This exotoxin is

discharged from the organism into the culture medium and is, therefore, separable from the bacteria. When the bacterium dies and undergoes disintegration, it gives off another poisonous substance called endotoxin. These toxins are injurious to the human organism and become an etiologic factor in disease, not because its purpose is to cause disease but because the lowered resistance of tissue has permitted the bacteria to establish a domicile in the human body.

Adjustments do not act upon the bacteria present in disease, but they do act upon tissues in which the bacteria are growing. As metabolism becomes normalized and normal cellular activity restored, the environment becomes unfavorable to the bacteria; it then becomes impossible for the bacteria to be propagated. As the body forms its anti-bodies, the micro-organisms become extinct.

The incubation period varies greatly in the various diseases. The following table gives the average time that elapses between the exposure and development of symptoms:

Anthrax	2 days
Bubonic plague	4 to 6 days
Chancre (soft)	1 to 2 days
Diphtheria	2 days
Erysipelas	4 to 6 days
Gonorrhea	3 to 5 days
Hydrophobia	20 to 60 days
Influenza	3 to 4 days
Malaria	6 to 10 days
Measles	9 days
Mumps	15 days
Recurrent fever	5 to 6 days
Rubella	18 days
Scarlatina	2 to 5 days
Smallpox	12 days
Syphilis	20 to 30 days
Tetanus	2 to 3 days

Typhoid fever	14 days
Typhus	21 days
Vaccinia	3 days
Varicella	14 to 15 days
Whooping cough	8 days
Yellow fever	3 to 4 days

Reportable Diseases

The list of reportable diseases varies somewhat in different states. The Chiropractor should inform himself on the reportable diseases by securing from the Secretary of the State Board of Health a synopsis of the health laws and a list of the reportable diseases. In most states the practitioner is required to report the following diseases: acute infantile paralysis, diphtheria, cerebrospinal meningitis, pink-eye, hook worm disease, leprosy, measles, mumps, influenza, German measles, scarlatina, smallpox, trachoma, typhoid, paratyphoid, typhus, chickenpox, whooping cough, and erysipelas. Several states now require a report of all venereal diseases either by name or by number. The practitioner is required to instruct the patient and provide him with educational literature bearing upon his disease so that he may observe the health laws.

Prognosis

Prognosis is a forecast of the probable course and termination of a disease. The course and termination of a disease depend upon its nature, its degree of severity, the vitality of the subject, age, recuperative power, and numerous other factors. The prognosis of a given case may differ materially from that of another case suffering from the same disease. No matter what the age of the patient nor how great the vitality or recuperative power, a good prognosis could not be expected where great destruction of tissue has been caused by disease. When disease produces destruction, nature brings about certain reparation, usually by means of connective tissue. A scar

Panophthalmitis = inflamation of entire eye-ball, destroying all of eye ball,

is an example of nature's method of repairing a deep cut through the skin. This scar is permanent, replacing normal healthy skin. When digits have been amputated by dry gangrene, there is no method capable of replacing them. Several diseases of the nervous system have destructive changes in the nerve tissue, wherein it is replaced by connective tissue. The prognosis in these cases may be good so far as life is concerned but highly unfavorable so far as recovery is concerned. An injury to the eye in early childhood, such as gonorrheal conjunctivitis, may lead to corneal ulcers and ultimately to panophthalmitis, which destroys the entire eyeball. The diseased organ ultimately becomes a mass of scar tissue, deformed in shape and color and rendered totally functionless. The patient may live to old age, yet there is no possibility whatever of restoring vision to the affected organ. Before undertaking the task of prognosing the case, make a careful and thorough examination to ascertain the general physical condition of the patient, the damage produced by the disease, and the nature of the disease; weigh these facts carefully with the other facts upon which prognosis depends. With good judgment and a thorough knowledge of the structure and function of the human body in health and disease it is reasonable to presume a fairly accurate prognosis.

Typhoid Fever

Definition.—Typhoid fever is also known as **enteric fever, abdominal typhus, and autumnal fever.** It is an acute febrile disease characterized by a general fever and a localized ulcerative inflammation of Peyer's patches of the small intestine.

Adjustment.—Adjustments should be made according to spinal findings in middle dorsal, lower dorsal, and upper lumbar areas of the spine. The adjustment of the middle dorsal area affects the thermogenetic subsidiary centers, especially those of the liver, decreasing the amount of heat production. The adjustment of the lower dorsal area affects the thermo-

lytic subsidiary centers, increasing the heat dissipation via the skin and kidneys. The adjustment of the upper lumbar area increases the normal transmission of nerve energy to the intestines.

Bacteriology.—The micro-organism of typhoid fever is the Bacillus Typhosus of Eberth. It is rod-shaped, flagellated, motile, and gram-negative. It is conveyed to the body chiefly through water and food. Upon entrance into the body it becomes quite generalized; and it is possible to recover the organism from the sweat, urine, sputum, feces, and rose spots of the skin. The incubation period is about 14 days.

Paratyphoid Bacillus "A" and Paratyphoid Bacillus "B" are the micro-organisms found in some cases diagnosed as typhoid fever. Morphologically they are similar to the bacillus typhosus but differ in their cultural characteristics. Cases caused by the paratyphoid bacillus are usually milder and of shorter duration. The onset of these cases is more abrupt; intestinal hemorrhages are rare; and perforations do not occur.

Pathology.—Structural changes are observable in nearly all glandular structures, but more particularly in lymphoid tissues. Early congestion develops in the vessels of the intestinal mucous membrane, in the solitary glands, and in Peyer's patches. The involved tissue becomes edematous and pale. The pallor is due partly to the clogging of capillaries with large phagocytes and in part to the pressure from the edema. Necrosis develops in many of these glands and upon sloughing leaves ulcers. The ulcers may promptly heal, or the process of ulceration may continue, leading to hemorrhage and ultimately perforation. Healing occurs by the formation of a simple membrane devoid of glandular structures.

Symptoms.—Typhoid usually occurs in epidemics which begin during the summer or early autumn months. The disease develops chiefly in young adults between fifteen and thirty years of age. Young children and the aged are rarely attacked. Both sexes are equally susceptible to the infection.

tympanitic = drum like sound.

not a common disease at all seasons

Typhoid fever begins slowly with prodromal symptoms of headache, malaise, anorexia, nausea and vomiting, cough, epistaxis, and chilliness but with no rigors. There are pain and aching in the region of the spine, especially over the kidneys. Usually constipation is noticeable early in the disease. In some instances diarrhea is persistent prior to the onset of the fever. Occasionally it alternates with constipation.

The onset of the **initial stage** is so gradual that the patient is unaware of the beginning. The temperature increases at the rate of one degree each day until the adult stage is reached. The patient complains of headache, hebetude, aching throughout the body, and an uncomfortable position in bed. Examination of the abdomen will reveal it to be tympanitic, and tenderness is usually discoverable in the right iliac region.

During the first week the fever gradually rises; the evening exacerbation increases each day until by the seventh or eighth day the temperature has reached 103 or 105 degrees.

During the second and third weeks, the **adult stage**, the fever remains high and is of the continued type with slight morning remissions of from one to one and one-half degrees. The remission may occur in the evening and the exacerbation in the morning; it is then spoken of as the inverse type of fever but is of no clinical importance.

A rose rash appears on the abdomen between the sixth and twelfth day. It consists of macules 2 to 4 mm. in diameter and a deep red color. They will disappear upon pressure but immediately become red when the pressure is removed. These spots number less than twenty, are usually confined to the abdomen, but may appear upon the thorax. They are present about five days and upon fading leave a yellowish-brown spot. Very frequently there is a bronchial cough with slight expectoration, moist rales, and rapid shallow respirations. The pulse rate is accelerated but usually not to the extent that might be expected from the height of the fever. The pulse may be irregular and is dicrotic in cases of extremely high fever.

In Typhoid fever Pulse is slow compared to the fever.

Diarrhea is the most constant intestinal symptom and

In Typhoid - the spleen can be palpated.

usually appears during the stage of necrosis, which is toward the latter part of the second week. The stools are purulent in character, containing pus, necrosed epithelium, and glandular tissues. The abdominal distention increases, and the tenderness becomes greater during the adult stage. The spleen is greatly enlarged and may be tender. It is often the seat of a necrosis and occasionally ruptures, discharging necrotic material into the peritoneum.

There is a marked leukopenia in typhoid throughout the febrile period, the white cells frequently being reduced to 3,000. The red cells are slightly reduced toward the end of the disease. The sense of thirst is somewhat annulled; hence the urine is usually scant and highly colored. Albuminuria occurs in nearly one-third of the cases. The cheeks are flushed; the pupils are dilated; the tongue is heavily coated; and there are sordes in the mouth.

During the fourth week the fever terminates by lysis. The temperature reaches normal about the end of the fourth or early in the fifth week. The frequency of bowel movements is diminished. The mind becomes clear; and as the temperature approaches normal, the appetite returns. It is not uncommon for the patient to lose the hair, but this alopecia is very temporary.

A sudden drop in the temperature to 97 or lower is indicative of internal hemorrhage, usually brought about by the deepening of the intestinal ulcers. Should the intestinal wall perforate, the termination may be fatal and accompanied by the symptoms of shock. Sometimes the patient survives perforation but develops diffuse peritonitis which is indicated by elevation of temperature, pain, and tympanites.

Common complications are intestinal hemorrhage, perforation of the intestine, peritonitis, and pneumonia. Sequelæ consist of nephritis, phlebitis, cholecystitis, tuberculosis, and various forms of paralysis. Aphonia is not uncommon and results from toxic neuritis of the inferior laryngeal nerve.

Pneumonia is common complication which sets in febrile diseases & most people die from this more than the primary or 1st disease.
Pneumonia sets in as body resistance is low.

Several forms of typhoid are noted. The **ordinary** or **moderate** form is the most common and has symptoms as described in the preceding discussion. Its usual duration is 28 days, but the case may run 42 or 56 days. The **grave** or **severe** form has a temperature, usually amounting to hyperpyrexia with symptoms of the typhoid status. Most cases of this form are fatal. The **mild** form is characterized by a slight fever rarely exceeding 103 degrees, slight diarrhea, and a few nervous symptoms of a mild type. Abortive typhoid has a rapid onset, beginning with a chill, sudden rise in temperature, and marked symptoms common to the moderate form. The temperature falls by crisis during the latter part of the second week in this form, and a rapid convalescence follows. **Latent** or walking typhoid is characterized by slight fever, languor, anorexia, emaciation, diarrhea, and a few rose spots.

Differential Symptoms.—Typhoid may be distinguished from cerebrospinal meningitis by the sudden onset of the latter with marked cerebral symptoms from the beginning, Kernig's sign, and the absence of abdominal tenderness and diarrhea. Opisthotonus is common in meningitis and absent in typhoid. The eruption of typhoid occurs during the second week and appears on the abdomen, while the rash of cerebrospinal meningitis appears between the first and fifth days and soon becomes petechial in character.

Peritonitis resembles typhoid only in its abdominal symptoms: the respiration, course of fever, and Hippocratic countenance in the former will furnish a marked distinction between the two. Concealed suppuration or abdominal abscess will be differentiated by the irregular fever and the presence of leukocytosis.

Spinal adjustments are administered to cases of typhoid for the purpose of normalizing the enervated tissue and restoring normal functional activity. By adjusting those areas of the spine innervating the liver and the kidneys, the process of elimination is enhanced. Adjustments which correct disrelationships in the area of the spine supplying the small intes-

tines tend to improve structure and restore functional activity to that organ.

Typhus Fever

Definition.—Typhus fever is also known as *spotted* fever, *jail* fever, *hospital* fever, *camp* fever, *ship* fever, and Brill's disease; it is an acute febrile disease, characterized by sudden onset, a maculated rash, and a clinical course terminating by crisis, usually about the end of the second week.

Adjustment.—Adjustments in the greater and lesser splanchnic areas are indicated for the purpose of overcoming the toxemia and normalizing the production and dissipation of heat.

Bacteriology.—The micro-organism present in this disease is Rickettsia prowazeki. Its chief vectors are the body louse, the rat louse, and the rat flea. The disease flourishes in filth, and epidemics are believed to be carried to areas by the flea of rodents but to be transmitted from the patient by the pediculous corporis. The incubation period varies from five to twenty-one days but is usually two weeks.

Pathology.—There is no gross pathology from which all symptoms arise. Small blood vessels in the skin, spleen, liver, and central nervous system are found to be the seat of thrombi which are microscopic in size. The thrombi are accompanied by perivascular infiltration, capillary hemorrhages, and gangrenous ulceration.

Symptoms.—The onset of typus fever is sudden with a severe chill or recurrent chills, followed by a rapid rise in the temperature. The temperature continues to increase for three or four days, by which time it has reached 104 to 107 degrees. The fever remains high for 10 days or two weeks, during which time there are headache, malaise, cough, a rapid pulse which is often dicrotic, severe pains in the spinal region radiating into the extremities, and extreme prostration. The tongue is heavily coated and dry, the coating being white at

first but later as the temperature increases becomes dark brown and fissured. The facial expression is dull and the face is flushed; the eyes are congested and pupils contracted. The digestive symptoms are those common to febrile diseases, such as anorexia, nausea, vomiting, and constipation. The spleen is enlarged, and the urine is scanty and highly colored. Delirium appears early in typhus fever; this is a differential symptom from typhoid, in which it appears later. The delirium is often of the active type.

In the more severe cases there is carphologia, subsultus tendinum, and comavigil. The rash appears first on the abdomen, from whence it spreads to all parts of the body. It consists of mascular rose spots about 4 mm. in diameter, which soon become petechial and do not fade upon pressure as in typhoid. The rash appears between the third and fifth days of the disease, while in typhoid it appears during the second week of the disease. Typhus can further be distinguished from typhoid by the course of the fever, abdominal distention, and the Widal reaction of typhoid.

Rocky Mountain Fever

Definition.—Rocky Mountain spotted fever is an acute infectious disease characterized by severe chills, continued fever which terminates by lysis, and petechial eruption. This disease is also known as **tick fever.**

Adjustment.—Adjustments in the middle and lower dorsal areas will improve elimination and restore normal thermogenesis and thermolysis.

Bacteriology.—The disease predominates in the Rocky Mountain states and is transmitted to man by the wood tick. The micro-organism belongs to the group known as Rickettsia and closely resembles that of typhus. The incubation period varies from two days to two weeks.

Pathology.—There are no gross lesions other than the skin eruption which is mascular at first and later petechial. Microscopically there are numerous capillary hemorrhages with

thrombi in the skin, scrotum, ears, face, extremities, and vulva. The white cells are slightly increased and the red cells slightly decreased in the latter stages of the diesase.

Symptoms.—The onset is abrupt with a chill and severe pains radiating from the back into the extremities and all of the large joints. The face is flushed, the conjunctiva red, and the tongue heavily coated. The fever varies from 102 to 104 degrees, and in the more severe cases temperatures of 107 degrees have been reported. The pulse rate varies from 110 to 140 and is strong at first but tends to weaken during the second week of the disease. It is common that the pulse and respiration are out of proportion to the fever. The eruption begins as macules on the wrists, ankles, spine, forehead, arms, legs, chest, and finally the abdomen. Occasionally similar eruptions appear upon the mucous membranes. The macules become the site of petechial hemorrhages, changing the color to deep purple. The fever terminates by lysis during the second and third week of the illness at which time the eruption fades. There is moderate desquamation, chiefly at the site of the eruption.

A fatal termination usually takes place between the sixth and twelfth day of the disease, at which time the pulse becomes feeble but rapid, as are the respirations. Coma precedes death by a day, and the temperature may drop below normal but rises the day before death. Pneumonia is the only complication but is not common. The mortality varies widely in different parts of the world, being as low as 3% and as high as 90%.

Trench Fever — never fatal

Definition.—Trench fever is a specific eruptive disease charcterized by sudden fever, deep seated pains, and a tendency to relapse weeks after the primary attack.

Adjustment.—As in other infectious diseases without localized pathology, adjustments are indicated in the middle and lower areas of the spine. It is important that eliminative

organs be normalized to overcome hte toxemia from which the symptoms arise.

Bacteriology.—This disease is transmitted by the body louse which is the vector of the Rickettsia wolhynica. Since there is no mortality, pathologic changes have not been proven to exist; but the Rickettsia have been found in human tissues.

Symptoms.—After an incubation period of ten to twenty days, the onset is sudden with intense headache, general malaise, and fever of 102 to 103 degrees. The headache is unusually severe, and the patient complains greatly of pain radiating through the eyeballs upon their movements. There is intense myalgia in the lumbar region and lower extremities comparable with that of influenza. Some cases experience laryngitis and bronchitis with the characteristic cough and sputum. A macular eruption appears during the first day; it usually fades as the fever declines and reappears with each relapse. The eruption is distributed chiefly upon the chest and abdomen, occasionally extending to the extremities but never to the face. The pulse and respiration increase in proportion to the fever. The fever may last for two or three days or as long as two or three weeks. Other cases experience two febrile periods of four or five days each, between which there is a 24-hour remission. It is not uncommon that patients have several relapses weeks or even months after the primary attack.

The eruption is of importance in distinguishing trench fever from influenza. The extreme myalgia, prostration, and clinical course of the fever are similar in the two diseases.

Dengue

Definition.—**Dengue**, also known as **breakbone fever**, is an acute febrile affection, characterized by paroxysms of fever, pain in the joints and muscles, an initial erythema, and a terminal polymorphous eruption.

Adjustment.—The adjustment in case of dengue is C. P. in combination with K. P. Some cases may require local adjustments, as would be determined by spinal analysis.

Bacteriology.—There is no known micro-organism in this disease, though it is believed to be caused by a specific filtrable virus conveyed by the mosquito. The incubation period is from three to five days.

Pathology.—The joints of the extremities become greatly swollen early in the disease, this swelling is associated with intense pain. The muscles become stiff (contracted to minimize pain), and the skin is hyperemic.

Symptoms.—The attack begins suddenly with headache, chilliness, and intense aching pains in the various joints of the body. The joints become swollen, red, tender, stiff, and painful upon motion. The pulse is rapid and the respiration is short, quick, and shallow. When the fever is high, the patient feels exhausted and talks with difficulty. There may be delirium, stupor, or coma. Cutaneous hyperæsthesia is general. The rash may be of various kinds, as is indicated by the term polymorphous, and occurs at no definite time during the course of the disease. In some instances the eruption resembles measles, in others scarlet fever; and in others it is petechial.

The distribution of the rash over the body is not distinctive, as in some cases it may first appear upon the hands and feet, in others upon the abdomen, and in others upon the thorax. Upon the fourth or the fifth day the temperature has reached 105 or 106 degrees and then falls by crises with profuse sweating and amelioration of all symptoms, especially the pain. The apyretic period lasts two to four days, after which there may be recurrence for two or three days. The entire attack usually lasts less than two weeks.

Differential Symptoms.—Dengue is a disease of warm climates and may be mistaken for yellow fever, but in the latter there is a characteristic icteric tint to the skin, which occurs early in the affection, a slow pulse, high fever, and black vomit, which with the absence of cutaneous eruption is sufficient to form a differentation. Dengue differs from acute

rheumatism in that it has no eruption or acid sweats, and the course of the temperature in rheumatism is decidedly different.

Cerebrospinal Meningitis

Definition.—Cerebrospinal meningitis is an acute infectious inflammation of the meninges of the brain and spinal cord characterized by pain, muscular rigidity, and disturbed consciousness. It is also known as **cerebrospinal fever, spotted fever, and petechial fever.**

Adjustment.—Atlas or axis, with C. P. and K. P.

Bacteriology.—The Meningococcus Interacellularis Meningitidis is the organism found in this disease. It is conveyed by the air chiefly and enters the body through the mucous membranes from whence it is carried to the meninges. This organism is a diplococcus, being found in pairs, and is found chiefly within the polymorphonuclear cells of the cerebrospinal fluid. The incubation period varies from a few hours to ten days.

Pathology.—The meninges become swollen and hyperemic early, especially the two inner membranes. This is followed by an exudation of serum into the intermeningeal spaces, most marked at the base of the brain. The cranial and spinal nerve roots may be affected in this same manner.

Symptoms.—A severe chill with rigor marks the onset of the disease. This is followed by a rapid rise in the temperature of 101 to 104 degrees, intense occipital headache, spinal pain and tenderness, and possibly convulsions in children.

The muscles of the back and neck are hyperæsthetic and staff, producing cervical retraction or opisthotonus. There are usually marked sensory disturbances, such as photophobia, ageusia, anosmia, and hyperacusis. Strabismus, nystagmus, ptosis, and irregularity in the size of the pupil may exist. The cerebral symptoms of delirium, stupor, and coma may appear early and are always present. Petechia is the most constant and common cutaneous symptom; it appears from the first to

the fifth day, does not disappear upon pressure, and may be associated with herpes, erythema, or urticaria. Some of the joints are often painful and fixed by contraction of adjacent muscles. Kernig's sign is the principal diagnostic feature of the condition; it is the inability to extend the leg when the thigh is flexed upon the abdomen. The test is usually made with the patient lying in the recumbent posture; the thighs are then flexed upon the abdomen and extension of the legs attempted by lifting or tension on the heels. If cerebrospinal meningitis is present the legs cannot be extended, and the pelvis may be raised from the bed by the attempted extension. The temperature and pulse rate are irregular. The respiration may be of the Cheyne-Stokes character. The spleen is swollen; and a leukocyte count will show a leukocytosis, affecting principally the polymorphonuclear cells. The malignant form may have a fatal termination in a few days. The abortive form terminates by crisis after a few days' duration, and the patient usually recovers.

Influenza

Definition.—Influenza is also known as la grippe, grip, and catarrhal fever. It is an acute febrile condition characterized by slight fever, coryza, and severe prostration, the latter is out of proportion to the temperature.

Adjustment.—Since there are several forms of influenza, the adjustment will vary according to the form. In all forms the middle and lower dorsal areas should be adjusted. In the respiratory form middle or lower cervical or upper dorsal should be included. In the gastro-intestinal form the upper lumbar should be included. In the nervous or cerebral form the upper cervical region should be included.

Bacteriology.—It is assumed that the disease is transmitted by means of a filtrable virus. Its usual incubation period is a few hours to one week.

Pathology.—There is no localized pathology other than the inflammatory condition of the respiratory and alimentary mucous membranes.

Symptoms.—The three forms of influenza are the respiratory, gastro-intestional, and nervous. All forms have an abrupt onset with chilliness or chills and a sudden rise in the temperature. The fever may be of the continued or the remittent type. In mild cases the temperature may not exceed 101 degrees; in severe cases it may exceed 104 degrees. There are extreme drowsiness, headache, and general aching through the spine and extremities. Prostration is greater than in any other febrile disease having a comparable fever. The pulse and respirations are rapid; the face is flushed; there are marked thirst, loss of appetite, and not infrequently vomiting.

In the **respiratory form** there is catarrhal inflammation of the eyes, nose, throat, and bronchi. There are lacrimation, sneezing, coughing; the throat may be sore, and the cervical lymph nodes are enlarged. Sonorous rales may be heard in the chest. The inflammatory process may spread from the respiratory passages into the sinuses and eustachian tube. Involvement of the sinuses leads to considerable pain in the region of the affected sinus. Involvement of the eustachian tube produces impairment of hearing and may lead to otitis media and occasionally mastoiditis. The most serious complication of this form is pneumonia; it results from the inflammation spreading to the alveoli. Other possible developments are pleurisy, pericarditis, neuritis, and phlebitis.

The **gastro-intestinal form** is characterized by addominal pain and distention, vomiting of mucus, and diarrhea having a mucous stool.

The nervous form is characterized by unusually high fever, extreme debility, and an early delirium, stupor, or coma. It is frequently fatal, death being due to toxemia.

Pertussis or Whooping Cough

Definition.—Pertussis is an inflammatory condition of the respiratory mucosa, distinguished by a convulsive cough and a long-drawn inspiration, during which the characteristic "WHOOP" is produced.

Adjustment.—Vertebral palpation will reveal subluxations in the lower cervical or upper dorsal and lower dorsal regions.

Bacteriology.—Bordet and Gengou discovered a gram negative bacillus which is believed to be the causative micro-organism. The incubation period is two days to two weeks.

Pathology.—There are swelling and hyperemia of the mucous membrane of the nose, pharynx, larynx, and bronchial tubes. The exudate is composed largely of mucous during the catarrhal stage. During the paroxysmal stage it becomes fibrinous and extremely viscid. Pus cells later appear but are not numerous.

Symptoms.—The symptoms of whooping cough are divided into three stages—catarrhal, paroxysmal, and recuperative.

The catarrhal stage begins as an ordinary case of coryza with sneezing, cough, and watery nasal discharge which soon becomes mucoid. The cervical lymph nodes are usually enlarged; the appetite is poor; and sleep is often interrupted. This stage lasts about ten days.

The paroxysmal stage is characterized by a distinct alteration in the character of the cough; it may be said to be paroxysmal in character. The paroxysm begins with a series of short coughs, followed by a deep inspiration during which the whoop is produced. There may be several successive paroxysms of coughing, followed by the expectoration of thick creamy viscid mucous. Children under six years of age are, as a rule, unable to expectorate; they attempt to swallow the expectorate. Its viscid properties make swallowing difficult, and this leads to vomiting at the conclusion of a paroxysm. The number of paroxysms may vary from one every five or six hours to two or three every hour, and they continue for four or five weeks in the average case.

During the seizure of cough the face becomes deeply congested and cyanotic; the veins may stand out prominently upon the forehead and neck, and the eyeballs project. The

eyes become congested and swollen. The conjunctiva and skin may show petechia. Sometimes nosebleed occurs during the attack of coughing.

During the *recuperative stage* the cough lessens in frequency and severity. The expectorate becomes less viscid and is raised without great effort. All symptoms decrease and disappear in about two weeks.

Parotitis

Definition.—Parotitis, which is also known as **mumps**, is an inflammation of the parotid gland, which is characterized by swelling, tenderness, and stiffness of the jaws.

Adjustment.—Adjustments should be given in the cervical, middle dorsal, and lower dorsal regions of the spine. It is important to maintain efficient elimination, and it is equally important to obtain normal tissue resistance in the parotid gland.

Bacteriology.—There is no known organism found in this disease. It is believed to be transmitted by means of filtrable virus. The incubation period is usually fifteen days but has been known to vary from two days to three weeks.

Pathology.—There are swelling and inflammation of one or both parotid glands, often involving the cellular tissue around and pervading the gland. The inflammation is catarrhal in character, begins in the ducts of the gland, and rapidly extends to the gland proper. The infiltration of the serous fluid into the surrounding tissue often produces enormous swelling of the face and head, which subsides in eight or ten days. Occasionally the submaxillary gland, the ovaries, or the testicles are involved.

Symptoms.—The onset of mumps is rather sudden with general lassitude and slight fever, but in many cases the first noticeable symptom is earache or a dull aching pain about the angle of the jaw, which is increased by the taking of acid into

the mouth. There may also be headache, loss of appetite, and vomiting, but frequently the pain and swelling are the only noticeable symptoms. The swelling appears within 24 hours after the beginning of the pain around the ear and at first is unilateral, usually on the left side. Within two or three days the swelling appears on the other side and may be so extreme that it is difficult to recognize the patient. Mastication may be difficult, and it may become necessary for the patient to diet upon liquid food for a few days. Often swallowing, speaking, and hearing will be impaired during the swelling of the gland. In the more severe cases the temperature may reach 104 degrees, and the duration of the affection lasts much longer than the usual ten days. When orchitis develops, there is swelling of the testicle, preceded by a sickening pain, which soon assumes a drawing character. This may last a variable length of time, but under adjustments the pain subsides within a few hours and the swelling gradually disappears. Ovaritis is a less frequent complication of mumps and is associated with abdominal tenderness and pain upon deep respiration. The abdominal muscles become fixed, the respiratory movement is vertical, and the thighs may be flexed upon the abdomen. Two very unusual cases have been brought to the attention of the author, in which the entire vulva was enormously swollen, also the mammary glands. Both cases yielded to Chiropractic adjustments.

Variola or Smallpox

Definition.—Smallpox is an acute febrile disease, characterized by an eruption, which passes through four stages: the papular, vesicular, pustular, and crust.

Adjustment.—The specific adjustment in case of smallpox is C. P. and K.P. Adjustments do not materially shorten the course of the disease, but they do increase the efficiency and resistance of body tissues. Consequently recovery is prompt and complications rare.

Bacteriology.—There is no known micro-organism found in this disease. It is a well-known fact that the disease is transmissible and occurs in epidemics. It is believed to be due to a filtrable virus. The incubation period is from seven to fifteen days, twelve days being the average.

Pathology.—There is no morbid anatomy other than found in the skin due to the eruption.

Symptoms.—There are three forms of smallpox: (1.) The discrete or moderate form. (2.) The confluent or severe form. (3.) The hemorrhagic, malignant or black smallpox, of which there are two varieties, purpuric and hemorrhagic pustular forms.

The discrete form begins suddenly with recurrent chills and a rapid rise in the bodily temperature. There is intense headache and pains in the back over the kidneys which radiate into the legs. In children there are frequently convulsions in place of the recurring chills. The fever reaches 103 to 104 degrees within a short time, and delirium may be present during the first four days. The face is flushed, eyes bright, and pulse and respirations increased, the pulse ranging from 100 to 130. The degree of prostration is very great early in the disease. The bowels are usually constipated, while the urine is scanty and highly colored. On the third or fourth day the fever terminates by crisis with profuse sweating and a return of strength. Within 24 hours after the fever has disappeared, the eruption appears, first upon the exposed parts of the body. The first eruption consists of discrete papules which feel like shot under the skin. In the scalp they may be detected by palpation rather than observation. These papules may appear upon the mucous membranes of the nose, mouth, and throat and occasionally on the conjunctiva. Upon the fifth or sixth day the papules become vesicles, containing a clear serum and having slightly umbilicated centers. These vesicles become pustules on the eighth or ninth day when the serum is transformed into pus and the pustule is nonumbilicated. The pus-

tules are surrounded by a deep red halo except where the vesicles coalesce; the halo then surrounds the groups of vesicles. The stage of desiccation begins on the tenth or twelfth day when the pustules dry up, forming scabs. These scabs fall off about the end of the third week, leaving pits or scars.

During the pustular stage the fever again returns and is known as the fever of suppuration. Throughout the crust stage the fever subsides by lysis, reaching the normal temperature by or before the eighteenth day.

Confluent smallpox is also known as the severe form. Its initial symptoms are the same as those of the discrete form except that the temperature may be higher. The eruptions are more numerous and undergo changes more slowly. The papules become vesicles on about the eighth day of the illness. The vesicles become cloudy and are transformed into pustules on about the twelfth day of the illness. During the vesicular and pustular stage there is a great tendency toward confluency. Desiccation is slowed by these larger lesions; hence crusts are not mature until the end of the fourth or fifth week. Desquamation occurs during the fifth or sixth week. The duration of this form is about six weeks.

Malignant or hemorrhagic smallpox is the most severe form, having a high mortality. There are two varieties—

Black or purpuric smallpox begins with high fever, lumbar pain, and extreme prostration; upon the second or third day a diffuse ecchymosis occurs beneath the skin and conjunctiva. The ecchymosis spreads until the greater part of the body is covered, giving it a dark purplish color. There also are hemorrhages from the mucous membranes. This form of smallpox is usually fatal within a week without the appearance of papules, vesicles, or pustules. The cause of death is toxemia.

Hemorrhagic pustular smallpox proceeds like an ordinary severe case until the pustular stage; then hemorrhages occur into the pustules and from the mucous membranes. This form

is also fatal. Both types of the latter form are rare and not common in America.

Smallpox can be distinguished from chickenpox, in that the eruption of the latter usually appears upon the thorax instead of upon the face. The vesicles are larger in size, oval in shape, and superficial; they do not have a reddened areola. The constitutional symptoms are mild and there is no fever of suppuration.

Varicella or Chickenpox

Definition.—Chickenpox is an acute febrile disease, characterized by mild fever and a vesicular eruption which desiccates and desquamates in from three to five days.

Adjustment.—C. P. and K. P.

Bacteriology.—There is no known micro-organism in this disease. The incubation period varies from one to four weeks but is usually two weeks.

Pathology.—The skin eruption consists of small vesicles, which are entirely superficial and rarely coalesce. The vesicles are filled with a clear serum and dry up within three to five days after their appearance.

Symptoms.—The onset is usually sudden with chilliness, slight fever, anorexia, vomiting, and aching in the back and legs; but in many cases these initial symptoms are absent. Then the first noticeable symptom is the appearance of a vesicular eruption on the chest or elsewhere on the trunk. The vesicles are preceded by papules, but the papules become vesicles within a few hours, so that the papular stage is not always distinctive. The vesicles are discrete, ovoid in shape, and have flattened tops which are sometimes umbilicated. They contain a clear fluid which becomes cloudy in two days. The crusts are dark brown in color and form during the third to fifth days. Desquamation occurs within a week without leaving pits or scars.

Rheumatic fever always follows a streptococcus infection

Scarlatina

Streptococcus always follows this disease

Definition.—Scarlatina is also known as scarlet fever. It is not a mild form of scarlet fever but is the disease itself. It is an acute febrile disease characterized by fever and a diffuse scarlet exanthem, which disappears with desquamation.

Adjustment.—The adjustment should include middle and lower dorsal and lower cervical. The latter adjustment is of particular importance in cases of the anginoid type.

Bacteriology.—The streptococcus is found in the throat in all cases of scarlatina. For years it has been suggested that this organism was a possible cause of the disease. However, the streptococcus is one of the most common of pathogenic bacteria, and in no other instances do they produce an eruption similar to that of scarlatina. Drs. Dick and Dick carried out a series of experiments which would seem to prove that a strain of the Streptococcus Encapsulatis Hemolyticus is the bacterial cause of this disease. The incubation period is from two to five days.

Pathology.—The skin is the seat of an acute inflammation, which fades upon pressure and after death. The throat is also greatly inflamed and may be the site of ulcerations. Granular degenerations may occur in the liver, spleen, kidneys, and muscles.

Symptoms.—The disease is initiated by a chill and a rapid rise in the body temperature, the fever reaching 103 to 105 degrees. The throat is swollen and sore, causing dysphagia. A vomiting noted for its persistency is an important initial symptom. The pulse rate is rapid (110 to 140), and in 24 hours the rash appears, first upon the chest and neck but spreads over the entire body within a few hours. From a distance the skin appears to be uniformly red, but upon close inspection the eruption is found to consist of minute closely set red spots. Occasionally the rash rises in patches and may become papular in form. There may be petechia and ecchy-

Strawberry tongue common in Scarletina

mosis and occasionally sudamina. The eruption is bright red for four or five days. It fades as the fever declines and is followed by desquamation. The period of desquamation lasts two or more weeks, and during this time small or large pieces of skin are shed. The skin of the palms of the hands and palmar surfaces of the fingers may be peeled enmasse and constitutes the glove-like desquamation. With the appearance of the rash the throat symptoms become prominent. Swallowing is difficult; there is pain and tenderness in the throat and jaws; and inspection reveals inflammation of the pharynx and tonsils. At first the tongue is covered with a heavy white fur, through which extend the swollen red papillæ, giving to it the characteristic strawberry appearance. Within a few days the fur exfoliates, leaving the tongue bright red, after which it is known as the raspberry tongue. The spleen is somewhat enlarged, and headache, restlessness, and insomnia are usually present. Nocturnal delirium is present in the more severe cases. The urine is scanty, highly colored, and often albuminous. The fever declines on the fourth to sixth day by lysis, and convalescence is slow but gradual.

Anginoid scarlet fever is marked by a predominance of the throat symptoms with high fever and great prostration. Early this form resembles diphtheria and tonsillitis. It is distinguished from diphtheria by the appearance of the rash and the strawberry tongue, and from tonsillitis by the condition of the tongue plus the course of the temperature.

Malignant scarlet fever is characterized by hyperpyrexia (106-108 degrees). There are disturbances of consciousness and often convulsions. Eruptions are usually hemorrhagic, but the disease may terminate fatally without an eruption. The term malignant scarlet fever is applied to these unusual but severe cases occasionally found in extensive epidemics.

Measles or Rubeola

Definition.—Measles is an acute febrile condition characterized by an initial coryza and a rapidly spreading macular eruption.

Measles most common of all febrile disease.
Incubation 7-14 days.
Rubeola = sore throat

Bright light only causes discomfort with measles.

Adjustment.—C. P. and K. P. in combination with middle or lower cervical region for the respiratory catarrh.

Bacteriology.—It is assumed that this disease is transmitted by a filtrable virus. It occurs in epidemics chiefly in the winter and spring months. The incubation period is about nine days.

Pathology.—The only pathological condition in measles is a catarrhal inflammation of the mucous membrane lining the respiratory passages. The inflammatory process may spread by way of the eustachian tube to the middle ear; otitis media is a fairly common complication.

Symptoms.—Measles begins with chilliness, sneezing, drowsiness, muscular aching, and cough. The cough is at first dry, later becoming productive. Koplik's spots may be found on the mucous membrane of the cheeks during the catarrhal stage of the illness; they disappear when the cutaneous eruption develops. During the first two days the fever gradually rises and then remains for a day or two. On the fourth day the temperature again rises with severe headache, nausea, and vomiting. The eruption is macular in form. The macules are from two to four mm. in diameter and are first noticed on the face, from which they spread to all parts of the body. This gives to the skin a mottled or blotchy appearance. When the eruption has reached its height, it is most marked upon the trunk and disappears upon pressure.

About the sixth to eighth day the fever falls by crisis, and the symptoms lessen in severity. The rash fades and desquamation occurs in fine scales; it is spoken of as branny desquamation. Photophobia is a marked symptom from the onset of the disease and may persist for days after the eruption disappears. It is not uncommon to have disturbances in the senses of taste and hearing. Often the cervical glands are swollen, and the muscles of the neck are somewhat tense.

In black measles the eruption becomes hemorrhagic or may

End of Text

consist of petechial spots which increase in size, finally forming ecchymosis. The mortality in black measles is high.

German Measles or Rubella

Definition.—Rubella is an acute febrile disease of moderate severity, characterized by a mottled macular rash and a mild initial coryza.

Adjustment.—C. P. and K. P., with local for the respiratory catarrh.

Bacteriology.—The incubation period is from nine to twenty days. There is no known micro-organism present.

Pathology.—The mucous membrane of the nose, throat, and bronchi is inflamed, red, swollen, and has a catarrhal exudate. The skin is covered with a macular rash. Macules are small and of a rose red color.

Symptoms.—Rubella is initiated by a sore throat, chilliness, headache, and a slight fever. There are slight coryzal symptoms, not so severe as in rubeola. The rash appears upon the first or second day and may be the first symptom to manifest itself. It is first noticed upon the face, from whence it spreads to all parts of the body within 24 hours.

Character of the Rash.—The rash consists of slightly elevated, round or oval, and usually discrete spots which are of a rose-red color. A macular eruption may also appear upon the mucous membrane of the throat and lasts for the same length of time as the skin eruption, which is from three to five days. The desquamation is branny. The site of each macule is marked by a small brown spot of pigment, which gradually fades. Often the cervical glands are swollen, and the muscles of the neck are somewhat tense.

Differential Symptoms.—Measles is distinguished from German measles by the severe initial coryza, Koplik's spots, higher fever, marked constitutional symptoms, and longer duration of the former. The macules of measles are also darker in color and larger in size.

Diphtheria

Definition.—Diphtheria is an acute febrile disease characterized by a fibrinous exudate from the mucous membrane of the throat which forms a false membrane.

Adjustment.—S. P. and K. P. with cervical.

Bacteriology.—The Klebs Loeffler Bacillus is the microorganism of this disease. It is conveyed chiefly by the atmosphere but may also be carried by food and water. The incubation period is but a few days, usually two. Approximately 90 per cent of adults and 75 per cent of children between the ages of ten and fifteen are immune to the disease; children between the ages of one and fifteen show the greatest susceptibility. During this age limit about 50 per cent of the children are susceptible.

Pathology.—The three forms of diphtheria are named according to the location of the false membrane: they are pharyngeal, laryngeal and nasal. The pathological condition is the same in each except in location.

At first there is a swelling and redness of the mucous membrane, congestion of its blood vessels, and increased secretion of a thick viscid mucous. The exudate which is rich in fibrin appears as discrete grayish-white patches. These patches tend to enlarge and coalesce. This pseudomembrane is composed of mucous and epithelial and white blood cells. They are enmeshed in the fibrin and firmly attached to the mucous membrane from which they are derived. The cells suppurate about the eighth or ninth day. This process destroys the viscid property of the fibrin and detaches the pseudomembrane from the mucous membrane.

Symptoms.—The onset is sudden with chilliness, headache, pain in the back, aching in the extremities, and a sudden rise in the body temperature to 103 or 104 degrees. The throat is inflamed and sore with marked dysphagia. The adult symptoms depend upon the location of this false membrane.

In **pharyngeal diphtheria** the tonsils and fauces are swollen and red, resembling tonsillitis. The cervical glands may be enlarged and tender, impairing free movement of the neck. Shortly the exudate appears upon the mucous membrane of the tonsils, gradually spreading until it reaches the pillars of the fauces, the uvula, and the posterior pharyngeal wall. The membrane is closely adherent to the mucous membrane and cannot be stripped without leaving a bleeding surface. The swelling of the pharyngeal structures produce a degree of destructive dyspnea but less frequently than in laryngeal diphtheria.

About the eighth or tenth day suppuration occurs in the false membrane, causing it to slough and be expectorated. In young children there is some danger of the sloughed membrane being inhaled and causing strangulation. As the pseudomembrane disappears, recovery becomes rapid. In a few cases the exudate is confined to the tonsils and is called lacunar or tonsillar diphtheria. It resembles tonsillitis and is differentiated by a microscopical examination.

Laryngeal diphtheria may result from the pharyngeal inflammation spreading to the larynx. The pseudomembrane forms upon the laryngeal lining and the vocal cords. The chief symptoms are fever, rapid pulse, croupy cough, aphonia or dysphonia, and dyspnea resulting from progressive laryngeal stenosis. The face may become deeply cyanosed, and the respiratory muscles are overactive. The sternomastoid muscles are unusually prominent, assisting in respiration. The anterior nares may be dilated upon inspiration. Shreds of the pseudomembrane may be dislodged and expectorated, affording slight relief. Further extension of the pseudomembrane into the bronchi usually leads to their complete obstruction with suffocation.

Nasal diphtheria is usually an extension of the pharyngeal form and is associated with it. There is mouth breathing, offensive and bloody discharges from the nose, epistaxis, fever, and prostration.

Diphtheritic paralysis is the most common sequela of diphtheria and may follow any of the three forms. It occurs in 10 to 15 per cent of the cases, usually during the stage of recovery. This is a toxic neuritis. It usually affects the uvula and soft palate and is characterized by nasal voice, regurgitation of food through the nose, dysphagia, and disorders of taste and hearing.

Erysipelas

Definition.—Erysipelas is an acute infectious disease characterized by erythema and edema of the skin.

Adjustment.—The adjustment for facial erysipelas is cervical in combination with middle and lower dorsal.

Bacteriology.—Erysipelas is believed to be a streptococcic infection of the skin and subcutaneous tissue. The name Streptococcus Erysipelatis has been applied to this organism which belongs to the group of pus-forming streptococci. The incubation period is from three to seven days. It is most commonly transmitted by direct contact, filthy hands, or surgical instruments which have not been sterilized.

Pathology.—Local cutaneous redness with swelling and edema constitutes the principal structural changes in this disease. The most common complication is subcutaneous abscesses. These abscesses may be large and flaccid or may be tense and accompanied by contractures of adjacent muscles. The face is the most common location, but the disease may develop in the skin at other locations and occasionally in the mucous membranes.

Symptoms.—The disease is initiated by a severe chill or chilliness, followed by a rapid rise in the body temperature to 103 or 105 degrees. This is accompanied by prostration, dry tongue, rapid heart action, and early delirium. Gastric symptoms of anorexia, nausea, and vomiting are common. A small red spot is noticeable upon the bridge of the nose and spreads to the cheeks, scalp, and ears. The reddened area is

greatly swollen, glossy, and tense. Vision is obstructed due to extreme swelling of the eyelids. Small vesicles appear and may be accompanied by a burning pain. The cervical glands become enlarged; the throad is red and sensitive. The fever remains high with slight remissions for seven or eight days when it terminates by crisis with profuse sweating. Upon the disappearance of the fever the swelling subsides and desquamation follows. Occasionally the cells in the accumulated serum in the subcutaneous tissues undergo suppuration, forming subcutaneous abscesses. In facial erysipelas the abscess usually forms at the angle of the jaw and is accompanied by trismus. The fever becomes intermittent as is typical of suppurative diseases.

Toxaemia

Definition.—Toxæmia is a form of blood or serous poisoning, resulting from the absorption of poison from some local lesion or pathological condition. Examples are diphtheria, typhoid, erysipelas, or tetanus. Sapræmia is a form of toxæmia, due to the absorption of putrefied toxins.

Adjustment.—C. P., K. P., and local, depending upon the location of the pathological condition from which the toxins are being absorbed.

Symptoms.—Toxæmia begins with malaise, weakness, restlessness, headache, and fever. Of these the fever is the most pronounced and constant symptom. The pulse is rapid and weak. There is usually a leuckocytosis, and there are symptoms of the pathological condition from which the toxins are being absorbed. It is of marked importance to note that toxæmia begins with slight chilliness and not a severe chill and rigor.

Pyemia

Definition.—Pyemia results from the absorption of pus from suppurative conditions, such as ulcerations or abscesses.

Adjustment.—C. P., K. P., and local.

Prostration = Extreme exhaustion

Pathology.—Pus absorbed from an abscess may be conveyed by the blood as pus emboli. These emboli may lodge in numerous vessels and produce multiple abscesses. Each abscessed area becomes inflamed, and many adjoining blood vessels becomes obstructed by infectious thrombi. The more common locations of these abscesses are the liver, spleen, kidneys, lungs, brain, and periosteum of bone.

Symptoms.—The onset of pyemia is marked by a severe chill, which is followed by a rapid rise in the body temperature, the fever reaching 103 to 105 degres.

The chills, high fever, and sweating recur at irregular intervals. There are usually anorexia, nausea, and vomiting. The urine is scanty and highly colored; the bowels are contive; the tongue is coated; the skin is hot and dry; the pulse is feeble and rapid; there is great prostration; and the skin may be moderately discolored from toxemic jaundice.

If the hyperpyrexia is prolonged, the patient will become delirious, stuporous, or comatose. The symptoms of pyemia are antedated by the symptoms of the abscess which causes the pyemia. Abscesses with drainage are not apt to cause pyemia; but should the opening draining the pus close, absorption of pus would immediately be promoted. In this way pyemia may develop from chronic suppurations where the suppurative process continues after drainage ceases.

The cardinal symptoms of pyemia are irregular chills, fever, and sweats. In pyemia, delirium and coma occur as a late symptom, while in septicemia they appear early.

Septicemia · Child bed fever

Definition.—Septicema is an acute febrile disease caused by a bacterial infection of the blood stream, occurring with or without a local site of infection and without a metastatic focus of suppuration.

Bacteriology.—A number of micro-organisms are capable of bringing about the condition known as septicema. Among those which most commonly exist are the Streptococcus Pyogenes, the Staphlococcus Pyogenes; the Bacillus Proteus; the Bacillus Pyocyaneus; and the Pneumococcus.

Adjustment.—C. P., K. P., and local.

Symptoms.—Septicemia may develop rapidly from an infected wound or septic surgery or following childbirth.

The onset is sudden with a sensation of chilliness and a moderate rise in the body temperature. The fever is usually of the continued type but may have decided morning remissions. There are headache, anorexia, nausea, vomiting, and an early delirium. The pulse is small and rapid, the tongue becomes dry and brown; the spleen becomes enlarged; and there is a general enlargement of the lymphatics in the locality of the part affected. There is usually cutaneous erythemia, involving the skin at the site of the inoculation with considerable swelling due to the infiltration of serum. Pain is severe and may radiate throughout the extremity or part of the body in which the infection occurred.

The early prostration, delirium, and coma are characteristic symptoms of septicemia. There may also be a slight toxemic jaundice, petechial spots on the skin, and albumin in the urine.

last epidemic occurred in New Orleans in 1905

Yellow Fever

Definition.—Yellow fever is an acute febrile disease characterized by toxæmia of varying intensity, jaundice, and a marked tendency to gastric hemorrhage.

Adjustment.—C. P., S. P., and K. P.

Bacteriology.—The bacterium of yellow fever has been termed the Leptospira Icteroides. It was discovered by Noguchi and was obtained from the blood of patients suffering with the disease. It is conveyed to the human being by a

mosquito, the name of which is Stegomyia Calopus Fasciata. The method of transmission was definitely proven by Dr. Walter Reid in the year 1900, but the existence of the Leptrospira is questioned. It is now accepted that the causative agent is a filtrable virus.

Pathology.—Pathological changes develop in the liver, kidneys, and heart. Necrosis develops in the central portion of the lobes of the liver with various types of degeneration involving the less seriously affected cells. These changes are believed to explain the jaundice which develops. Degenerative changes of mild or severe degree occur in the kidney, causing cells and casts to appear in the urine. The heart undergoes fatty degeneration chiefly which causes its muscles to become flabby and ineffective. Hemorrhages which are visible in the skin may also occur in the lungs, kidneys, and mucous membranes of the ailmentary tract. This is particularly true of the vessels in the stomach wall and explains the black vomitus so characteristic of this disease.

Symptoms.—The symptoms may be divided into three stages: initial, remission, and collapse.

The initial or first stage begins with chilliness, or more suddenly with a chill, and is followed by a rapid rise in the body temperature to 100 or 106 degrees. This is accompanied by severe headache, pain and aching in the back and limbs, a sore throat, a coated tongue which becomes brown and fissured, epigastric tenderness, nausea, and vomiting.

The face is flushed; the eyes are congested and are extremely sensitive to light. The eyelids and lips are swollen. A slight subicteric tint is noticeable in the conjunctiva and skin.

The stage of remission is marked by a decided remission or possibly an intermission in the temperature and a decrease in all the symptoms. The fever may fall by crisis during this stage and recovery occur. Usually the fever again rises in two or three days, and the remission gives way to the stage of collapse.

With the second rise in the body temperature the skin becomes deeply bronzed or jaundiced. There is severe vomiting, the vomitus often being of a black color and consisting of altered blood. There may be epistaxis, bleeding from the gums, and petechia in the skin. The volume of urine is diminished. Urinalysis reveals renal epithelial cells, hyaline or granular casts, albumin, and blood cells. In serious cases the function of the kidney is entirely suppressed with the development of uremia. The pulse is slow in relation to the temperature curve throughout this febrile period.

With the development of collapse there is a drop in the temperature; the pulse is small, rapid, and easily compressible; the respirations are accelerated and shallow; the face is pale and has an anxious expression. In favorable cases the fever terminates by lysis after two or three days with gradual recovery.

Dysentery

Definition.—Dysentery is an acute inflammatory disease of the mucous membrane lining the intestines, characterized by the frequent discharge of bloodstained mucous, tenesmus, and griping.

Adjustment.—C. P., K. P., and local according to the spinal findings in the splanchnic and lumbar areas of the spine. Tenderness traceable from the abdomen often leads one to the point of impingement.

Bacteriology.—In the catarrhal form, which is also called Acute Ileocolitis or Follicular Dysentery, there is no specific micro-organism. This type is more common in the United States and does not occur in epidemics.

Amœbic Dysentery is a form of tropical dysentery. The micro-organism of this form is the Endamœba Histolytica. This organism in conveyed through food and water and is capable of being carried by flies.

The Acute Specific is also called Bacillary Dysentery and is caused by the Bacillus of Shiga. As in the amœic form, this organism is conveyed to the human body through contaminated food and drink.

Pathology.—In catarrhal dysentery there is a diffuse hyperemia of the colon and lower portion of the ileum. The follicles are enlarged and discharge large quantities of mucous. Blood which escapes from the engorged vessels becomes thoroughly mixed with the mucous before being discharged; hence the term "bloody flux."

In amebic dysentery there are inflamed patches of mucous membrane particularly involving the colon. Between these patches portions of normal membrane may exist. There is a marked tendency for the development of abscesses in the intestinal wall and in the liver in the serious cases. The stools contain serum, mucous, and the contents of ruptured abscesses.

In specific dysentery the inflammatory process is diffuse in the ileum and colon. All follicles are enlarged. Exudative products are discharged from the follicles. Necrotic areas frequently develop leaving ulcers. In chronic cases these ulcers may be serpiginous-like which leave deforming scars.

Symptoms.—**Catarrhal Form.**—The catarrhal form begins with a moderate diarrhea lasting a day or two. The diarrhea is accompanied by griping abdominal pains. When the stool becomes mucoid, the frequency of bowel movements is greatly increased. The tenesmus is most annoying; it consists of a feeling of rectal fullness and a sensation of bearing down in the pelvis. There is usually a fever of 100-102 degrees. There are rapid loss of weight due to dehydration and extreme thirst. The pulse at first is rapid and strong but becomes smaller as the patient is dehydrated. The number of stools may vary from a dozen to two hundred per day. Most cases recover, but weeks or months may be required for complete convalescence.

Char. of all 3 - colicky stool.

Amebic Form.—This form has a very gradual onset with an increasing diarrhea. Fever is slight and may be absent. Tenesmus and colicky abdominal pains are present at the onset only. During this period the stools are frequent and fluid. After a few days the stool becomes yellowish-gray in color and contains blood, mucous, and shreds of membrane. There is gradual and steady loss of flesh and strength. The patient becomes anemic and is greatly emaciated. The course of this form is from six to twelve weeks. The patient recovers slowly because of the extreme emaciation and anemia.

Acute Specific Form.—Acute specific dysentery is a semi-tropical disease and abounds in the western Pacific area. It has been imported into isolated areas throughout the United States. The onset is sudden with colicky abdominal pains. The stools are of a serous consistency at first but soon become mucoid and bloodstained. Tenesmus is constant; the fever is moderate and accompanied by anorexia, nausea, weakness, thirst, scanty or dark colored urine, coated tongue, and foul odor of the breath. This form may be fatal within 48 hours, or recovery may begin within two or three days. The usual course of the affection is about three weeks.

Due to the destructive nature of the pathology there is considerable mortality among these cases. Convalescence requires weeks and months after the active stage has been arrested.

Chronic Dysentery.—An attack of dysentery lasting less than three months is looked upon as being acute and beyond one year in duration as being chronic. The fever subsides during the acute stage; hence all cases of chronic dysentery are afebrile. The stools vary from three to a dozen in 24 hours and are usually frothy and of a yellowish-brown color. At times these stools are bloodstained because of ulcers which persist in the mucous membrane of the colon. Tenderness is traceable from the abdomen where it is diffuse to the lower dorsal or lumbar region of the spine. Patients suffering with chronic dysentery are usually underweight and tire easily. Studies of the blood reveal a secondary anemia.

Cholera-Asiatica

Definition.—Cholera-Asiatica is an acute febrile disease, characterized by severe purging and a rapid collapse.

Adjustment.—C. P., K. P., and upper lumbar.

Bacteriology.—The Vibrio Choleræ, discovered by Koch in 1884, is found in the stools of patients suffering with cholera. The bacteria are carried by water, milk, butter, meat, and oysters. The incubation period is from two to five days.

Pathology.—The mucous membrane of the intestines becomes inflamed; Peyer's patches are enlarged; and there is an exudate from the mucous follicles consisting of mucous, serum, fibrin, and destroyed epithelium. Ulcers may form in the intestinal mucosa. The stomach and intestines contain large quantities of a thin milk-like fluid.

Symptoms.—The symptoms are grouped into three stages.

First Stage.—The onset is with colicky abdominal pain and a moderate or severe diarrhea. There are headaches, mental depression, nausea, vomiting, and great weakness. The vomiting is characteristic in that it is persistent. After the first day the stools consist of a gray water, hence the name "rice water stools." In such cases the condition is called **cholerine.**

Second Stage.—The stage of collapse is marked by persistent vomiting of a thin watery fluid resembling the stools. The stools are passed without pain and without effort; and while tenesmus may be present, it is not common. The tongue is dry and heavily coated; thirst is extreme. The patient becomes exhausted and weak; the skin becomes cold, clammy, and shrunken; the lips and fingers may be cyanosed; the face is pale; the eyeballs recede; and the surface temperature drops below normal. The rectal temperature may be 102 to 104 degrees. The patient may remain in a stupor during the entire stage which lasts two or three days. Most fatalities occur during this period. Cases which recover develop the stage of reaction.

Third Stage.—The third stage is also called the stage of reaction. It is marked by an increase in the surface temperature, increase in the flow of urine, return of color to the skin, and increase in the strength of the pulse. The stools become less frequent and take on a fecal character. Recovery is gradual.

Bubonic Plague

Definition.—This is an acute febrile disease of very rapid course characterized by hemorrhages, carbuncles, and inflammation of lymphatic glands.

Adjustment.—C. P., K. P., and lower lumbar region.

Bacteriology.—The organism of this disease is known as Bacillus Pestis of Yersin. This organism is found in the soil and is conveyed by foodstuffs and water. Lice, flies, fleas, and mosquitoes serve as conveyors, while infected rodents also serve to spread the contagion. The incubation period is from four to six days.

Pathology.—The inguinal and other lymphatic glands undergo inflammatory changes and suppurate. The pus may be discharged by open sinus or absorbed. Hemorrhages occur in the skin and mucous membranes of the body.

Symptoms.—The initial symptoms are headache, backache with stiffness of the muscles, vertigo, mental depression, rapid respiration, epistaxis, and hemoptysis. After 24 hours' duration the adult or secondary symptoms are apparent, beginning with a chill and a rapid rise in the temperature to 104 or 106 degrees. There is intense thirst; the tongue is dry and brown; and there are nausea, vomiting, and delirium. Petechia and ecchymosis may be localized or diffuse. The inguinal lymphatics become enlarged during the first four or five days forming buboes, from which the disease receives its name. The axillary and cervical glands become involved later, and all undergo suppuration. Carbuncles may be diffuse but are particularly common upon the lumbar and pelvic area.

The internal form is marked by similar cutaneous eruptions. The mucous membranes of the respiratory, genito-urinary, and digestive tracts become hemorrhagic, indicating virulent toxemia. This form may be rapidly fatal and has a high mortality.

Malaria

Definition.—Malaria is an acute febrile disease due to the Plasmodium Malariæ and characterized by intermittent or remittent fever.

Adjustment.—The middle and lower dorsal area should be corrected as this will tend to establish balance between thermogenesis and thermolysis. Normalization of the splanchnic areas will insure more normal activity of the liver and kidneys and enhance the elimination of toxins.

Bacteriology.—The micro-organism of malaria is the Hemameba or Plasmodium Malariæ. This organism is transmitted by a mosquito known as Anopheles.

Symptoms.—The course of malaria may vary greatly according to the kind of Plasmodium that has invaded the body. Some forms have an intermittent fever, while in others the fever follows a remittent course; hence the general classification of intermittent malaria and remittent malaria.

Intermittent Forms.—The symptoms of intermittent malaria may be divided into three groups: those of the chill period, fever period, and sweat period.

The chill period begins with malaise, languor, headache, gastric uneasiness, nausea, and vomiting. The chill begins abruptly with violent shaking, chattering of the teeth, coldness of the skin, cyanosis of the face and hands, and rapid pulse. The chill is believed to result from a discharge of toxins into the circulation which causes the visceral vessels to dilate; as a consequence there is a relative cutaneous ischemia with coldness. The temperature of the engorged organs is rapidly increased during the chill period.

When the surface of the body becomes warm, the chill period gives way to the fever period. The fever commonly attains 104 to 106 degrees. The tongue becomes coated; the breath becomes foul; and digestive disturbances are common. The spleen is enlarged and has been designated as the "ague cake." Years ago malaria was called "ague" as well as "the chills and fever." Splenic enlargement may persist for sometime after the fever has disappeared.

The sweat period begins when the fever terminates by crisis after a duration of two to six hours. Sweating is profuse. The patient feels relieved but exhausted. In intermittent malaria these alternating paroxysms of chill, fever, and sweats occur with more or less regularity every day, every second day, or every third day.

Remittent Forms.—The remittent form of malaria is so named because its fever is of the remittent type. The fever is subject to marked remissions which may be regular or irregular. There are no chills during a rise in the temperature after a remission, but the onset of the fever is characterized by a single severe chill similar to that of the intermittent forms. The skin is flushed and in due time may become pigmented. Severe cases may show cerebral symptoms and develop cutaneous hemorrhages. The attack of fever may last two days or be continued for weeks. Remittent types of malaria occur most commonly in the late summer and autumn months. In most cases of malaria the leukocyte count remains near normal, but there are occasional cases which have a moderate leukocytosis varying from ten to twenty thousand.

Malarial Cachexia.—Malarial cachexia is due to the destructive influence of liberated toxins upon the nutrition of the body and more particularly upon the red cells. The red cells are reduced in number and in hemoglobin content. These patients have dyspnea upon exercise, congestion of the conjunctiva, enlargement of the spleen, and a temperature slightly above normal. Cachectic patients often complain of being

"full" of malaria. They are physically handicapped by the anemia and psychically influenced by their appearance. Most cases of malarial cachexia recover in time.

Acute Rheumatic Fever

Definition.—This is an acute febrile condition in which there is multiple arthritis attended by great pain and following focal infections. It is also called **inflammatory** and **acute articular rheumatism.**

Adjustment.—C. P., K. P., and local for the focal infection.

Bacteriology.—This condition is secondary to septic focal infection. It is commonly associated with scarlet fever, follicular tonsillitis, abscessed teeth, and appendicitis. The bacteria involved in these infections may be the Streptococcus, Staphlococcus, Colon Bacillus, or the virus of Influenza. The exotoxins and endotoxins from these bacteria chemically involve the body and produce the inflammation of the joints. The inflammation does not become purulent.

Pathology.—The joints, usually the wrist, ankles, elbows, and knees, are the site of the inflammation. They become red, swollen and tender. The synovial membrane is especially affected, hence movement induces great pain.

The synovial membrane may become permanently thickened; the bones may become deformed; and the joint may become stiff from the exostosis and ankylosis that result from the inflammatory process.

Symptoms.—The fever is preceded by a sensation of chilliness, or by a severe chill, with rigors, malaise, aching pain in the joints, sore throat, anorexia, nausea, and perhaps vomiting. The fever rises suddenly to 102 or 104 degrees with its attending symptoms of debility, costiveness, spinal aching, hot dry skin, scanty and highly colored urine, and digestive disturbances.

This usually affects the wrist, ankle, elbow, and knee joints but may affect all the joints of the body. They become hot,

red, swollen, tender, and painful upon motion. The inflammation seems to be in the tissues around the joint rather than in the joint. The synovial fluid is suppressed in secretion, and the muscles adjacent to the joint are contracted so as to prevent motion, thus minimizing pain. The fever is of the remittent type; sweating occurs with the remissions; and during the exacerbation the skin becomes hot and dry. The sweat is highly acid as is indicated by the odor. The urine is scant, highly colored, and strongly acid.

The arthritis of rheumatic fever involves two or more joints simultaneously. After a week's duration the evidences of inflammation tend to subside in the affected joints, but similar changes appear in a portion of the unaffected joints, most commonly inovlving an equal number of joints on each side of the body. This flitting from joint to joint may recur several times before the disease terminates. Joints that have previously been injured are the ones first attacked. Sudamina appear upon the skin around the joints when sweating occurs after prolonged fever.

The course may be acute, recovery taking place after a few weeks' duration; or it may be subacute or chronic. In the chronic cases the fingers, wrists, ankles, and other joints affected may become permanently deformed and stiff.

Lobar Pneumonia

Definition.—Lobar pneumonia is an acute febrile condition characterized by an inflammation of the mucous membrane lining the bronchial tubes and their communicating air cells. Consolidation involves one or more complete lobes. This disease is also called **adult pneumonia, lung fever, unilateral pneumonia, Frank pneumonia, and acute penumonia.**

Adjustment.—In the adjustment special attention should be given to discovering the causative subluxation in the upper dorsal area of the spine. Adjustments in this area not only tend to normalize the inflamed lungs but also to improve in-

* Learn + remember the 4 stages of lobar pneumonia.

nervation of the heart. A strong heart is essential when the consolidated lung offers resistance to the pulmonary circulation. Adjustments in the middle and lower dorsal areas tend to increase elimination and normalize the production and dissipation of heat.

Superficial tenderness is diffuse over the affected portion of the lung, especially when pleurisy is present. This tenderness is traceable to upper dorsal foramina. The superficial sensory nerves, as a rule, are tender over the zone of the diseased viscus. Chiropractors should take advantage of this in determining the point at which nerve interference occurs.

Bacteriology.—The Pneumococcus, also known as the Diplococcus Pneumoniæ is the micro-organism found in the lung and sputum in this disease. Other micro-organisms such as the Steptococcus, Staphylococcus, and the Bacillus of Friedlander may also be found.

Pathology.—The pathology of pneumonia may be divided into three stages: first stage or stage of engorgement; second stage or stage of red hepatization; third stage or stage of gray hepatization.

1st stage. The first stage begins at the onset of the disease. The arterioles and their capillaries become dilated. The volume of blood contained in these vessels is increased while the velocity of the blood is diminished. The permeability of these vessel walls is increased and permits the escape of blood serum and cells which become infiltrated in available intercellular spaces. As a result the lung becomes heavier and less elastic. Its ability to expand is diminished. Exudate which appears from the mucous surfaces may be expectorated or accumulate in the air sacs effecting consolidation.

2nd stage. The second stage or **stage of red hepatization** is so named because the exudate not only contains mucous, serum, fibrin, albumin, and destroyed epithelial cells but also red blood cells in large quantities, which give to the exudate a reddish color. This red exudate fills up the terminal bronchioles and com-

municating air cells. The consolidated part is confined to one or more lobes of one lung; there is nonexpansion of this part. When a section is placed in water, it sinks indicating an increase in the weight of the lung structure.

The **stage of gray hepatization** begins when the red cells undergo disintegration. Hemoglobin is released, and the dead cells suppurate. During this stage the lung structure is still opaque to the X-ray and decidedly heavier than a normal lung. The consolidated part is dark or iron gray in color.

Resolution follows gray hepatization. Much of the exudate is absorbed, while some is expectorated. If resolution fails, the consolidation becomes chronic and leads to pulmonary abscess.

Symptoms.—The onset is usually sudden with a prolonged chill and rigor which is followed by a rapid rise in the body temperature to 103 or 105 degrees. Occasionally the onset is gradual, the fever attaining its height in a day or two. The fever is the continued type and persists for about one week. It terminates by crisis with profuse sweating and may be attended by shock.

The pain of lobar pneumonia is of two kinds: a dull pain usually referred to as headache, backache, or aching in the extremities; and sharp pains which occur with respiration. These sharp pains may be felt in the region of the nipple, axilla, or scapula directly over the portion of the pleura affected. The respirations are rapid and shallow, and the pain may be restricted by inhibiting the inspiration. The respiratory rate varies from 25 to 50, depending upon severity. The pulse is rapid, usually 110 to 130; in the early stages the pulse is large and bounding, but in the later stages and especially in the presence of a failing heart the pulse may be rapid and small. The face is somewhat flushed, more particularly the cheek on the side of the affected lung.

Cough is persistent and accompanied by bloodstained or deep rusty sputum; this sputum is composed of mucous with fibrin, red and white cells, epithelial cells, and bacteria. One marked property of the sputum is its viscosity. Herpes faci-

alis appears in the majority of the cases, especially upon the lips, nose, and cheeks. The tongue is heavily coated. There are anorexia, nausea, and sometimes vomiting. The urine is scant and highly colored. The bowels are usually sluggish, causing a moderate tympanites.

The patient tends to assume a lateral posture, lying on the affected side. This posture limits respiratory movement on the affected side and therefore lessens pain; at the same time it permits the unaffected side to move freely in the respiratory act. In severe cases dyspnea becomes an outstanding symptom. The accessory muscles of respiration are brought into action. The sternomastoids stand out prominently, and as a rule the nostrils dilate.

Physical signs.—Inspection of the bare chest will reveal diminished respiratory movement and intercostal retraction during inspiration. The intercostal retraction is due to the inability of the consolidated lung to follow the chest wall during its expansion.

Palpation reveals increased vocal fremitus over the consolidated lobe or lobes because the solidified lung is a better conductor of vibration.

Percussion reveals dullness over the consolidated lobe or lobes and frequently reveals hyperresonance at the apex.

Ausculation reveals crepitant rales at the onset. As exudate occupies the terminal bronchioles, the rales become coarse and of the subcrepitant variety. When consolidation is complete, the breath sounds are distinctly bronchial in character.

After the crisis the physical signs gradually disappear. The pulse becomes slow and large; the respirations are deep and approach normal frequency. In elderly people, however, there may be postfebrile delirium and repeated attacks of collapse; if the case is given adequate nursing attention and regular adjustments are continued, these do not retard recovery.

Should resolution of the consolidated lung fail, there is danger of necrosis and abscess formation. Daily examination

of the chest enables the chiropractor to be fully informed of the progress being made.

Typhoid pneumonia is a form which is very severe in character and in which the typhoid status supervenes. In this the cerebral symptoms predominate, consisting of delirium, prostration, stupor, coma, subsultus tendinum, and carpholegia.

Latent pneumonia is a form which is mild in character, and the symptoms of which do not appear until the stage of consolidation is reached.

Abortive pneumonia is a form in which the duration is less than the usual week and recovery is rapid.

Central pneumonia is so named because the consolidation begins in the center of a lobe. In this form pleurisy pain at the onset is not present.

Wandering or creeping penumonia is a form in which consolidation spreads from lobe to lobe, affecting the entire lung.

Obstructive pneumonia is a form in which the circulation of the blood through the capillaries of the affected area of the lung is hindered. This is produced by the pressure of the exudate upon the capillaries which lie in the lung tissue. This obstruction to the pulmonary circulation raises the endocardial pressure of the right ventricle. The added load may cause this ventricle to fail and dilate. Such failure produces pulmonary edema which may be considered a serious development. The pulse becomes rapid and thready; the respirations become rapid and shallow; the systolic blood pressure expressed in mm. becomes less in number than the pulse rate expressed in beats per minute; the breath sounds become coarse, first at the back or base of the lungs and later over all portions of the chest. Large sonorous rales become audible without the stethoscope.

Tuberculosis

Definition.—Tuberculosis is an acute or chronic affection characterized by the formation of tubercles, which has a ten-

dency to unite and undergo caseous, fibroid, and other degenerative changes. The lungs are most frequently affected, but tuberculosis may exist in any part of the body, in any organ, or generally throughout all of the tissues.

Bacteriology.—The Tubercle Bacillus, discovered by Koch in 1882, is found in the lesions and to some extent in the sputum in all types of pulmonary tuberculosis. This microorganism is also found in the lesions of tuberculosis in other portions of the body. As in other infectious diseases the tissues in which tuberculosis begins must be in a state of lowered resistance which renders those tissues susceptible to the infection.

The Tubercle.—The tubercle is the primary lesion of tuberculosis. It is grayish-white in color and when mature about the size of a millet seed. It is somewhat round in shape and feels firm when pressed between the fingers.

Microscopically it is composed of a collection of cells of various types which undergo degenerative changes. Each tubercle contains one or more multinucleated giant cells from which radiate fibers forming a network. In the meshes of this network are found epithelial cells, large and small leukocytes, polymorphonuclear leukocytes, fibrin, serum, granular debris, and tubercle bacilli. Larger lesions are found by tubercles coalescing, forming nodules. The tubercles and nodules undergo caseation.

The General or Typhoid Form of Tuberculosis

Definition.—This is an acute form of tuberculosis in which the tubercles are scattered throughout the body in most of the tissues and in which the symptoms of the typhoid status predominate.

Adjustment.—C. P., K. P., and upper cervical.

Pathology.—Most cases of general tuberculosis develop in cases of localized tuberculosis of the lungs or cervical glands.

This may develop in the patient whose energies have been dissipated as a result of other disease, malnutrition, overwork, or lack of adequate rest. In such cases the body defenses are no longer able to cope with the infection which spreads by way of the blood stream to the most susceptible organs. Tubercular lesions and abscesses may develop in bones, membranes, glands, and visceral organs. The laboratory and physical findings will vary according to the organs involved.

Symptoms.—The disease begins with malaise, languor, lassitude, spinal aching, and chilliness or a severe chill which is followed by a rapid rise in the body temperature to 100 or 104 degrees. The fever is the remittent type, having daily remissions exceeding two degrees; the pulse is rapid; the respirations are accelerated; the face is flushed; the tongue is heavily coated and brown in color; the spleen is enlarged and tender; the urine is scanty and highly colored. Pain is present when joints or serious membranes are involved but may be entirely absent in advanced cases where these structures are not attacked.

When the temperature approaches 104 degrees, delirium is a prominent symptom. It may be followed by the symptoms of the typhoid state from which this disease attains its name. The typhoid state is indicative of grave danger, the symptoms consisting of stupor, delirium, or coma; carphologia; subsultus tendinum; and lastly coma vigil. The duration may vary from two to four weeks. Recovery is improbable.

Acute Tuberculous Meningitis

Definition.—Acute tuberculous meningitis is an acute tubercular inflammation of the meninges of the brain and spinal cord.

Adjustment.—Upper cervical in combination with C. P. and K. P.

Pathology.—The tubercles may be scattered throughout the entire meninges. They are most numerous in the endothelium

of the vessels of the meninges at the base of the brain, and for this reason the disease is sometimes called **basilar meningitis.** The meninges become thickened, swollen, and nodular. The tubercular lesions may produce pressure upon the spinal cord and underlying brain, interfering with nerve function.

Symptoms.—There may be prodromal symptoms consisting of anorexia, nausea, vomiting, sleepiness, or irritability. Often there are headache, loss of weight, pallor, and indigestion. These symptoms may prevail for several weeks before an elevation of body temperature is discovered. The fever attains 102 to 104 degrees and follows an irregular remittent course. The headache is most often in the occipital region and becomes intense as the fever increases. Likewise, the pulse and respiration are accelerated. There is hyperesthesia along the spine which is accompanied by muscular rigidity. This causes cervical retraction when confined to the cervical region and opisthotonus when all the spinal muscles are involved. The pupils may be contracted if the nerve structures are not involved; but when the third nerve or its nucleus is impaired, the pupils may be dilated or unequal in size. Strabismus with or without ptosis may be present and may be of the convergent or divergent variety depending upon the nerve centers impaired. Paralysis may develop in one or all of the extremities. When the respiratory center is involved, Cheyne-Stokes respiration develops. This is regarded as a grave symptom. The duration is from two to four weeks and the outcome is unfavorable.

Acute Miliary Tuberculosis of the Lungs

Definition.—Acute miliary tuberculosis of the lungs is an acute form of tuberculosis, in which there is the formation of miliary tubercles throughout both lungs.

Adjustment.—Upper dorsal, C. P., and K. P.

Nerve Tracing.—Tenderness is traceable from the upper dorsal area of the spine. It usually follows the intercostal

spaces under the axilla and becomes diffuse over the anterior surface of the chest. Tenderness may be diffuse over the scapular and suprascapular areas.

Pathology.—The tubercles form in the lining membranes of the terminal bronchioles and in the endothelium of the pulmonary vessels. They become diffusely infiltrated in the apexes and hili of the lungs. In children exudate may be profuse and effect consolidation. In elderly patients exudate is slight and often not purulent. Cavity formation is rare.

Symptoms.—Preceding the onset of this disease there may have been latent pulmonary tuberculosis; possibly a bronchial cough with little or no expectoration and acute illness such as influenza or pneumonia lowers body resistance and activates the latent tuberculosis. Convalescence from the acute illness is slow, and symptoms of the acute tuberculosis develop. There is frequent chilliness with marked elevation of the temperature in the afternoon and evening. The pulse and respiration are rapid. Deep breathing induces cough which may be accompanied by mucopurulent sputum. Early in the disease the sputum is viscid, becoming purulent as the disease progresses. The cheeks are flushed during the fever.

Inspection reveals atrophy of the skin and subcutaneous tissue above the second rib. The supra and infraclavicular spaces are large. The scapulæ may project backward and become wing-like. The respiratory movement is small. In advanced cases there is intercostal retraction during inspiration. Palpation reveals increased vocal fremitus over the affected areas. Percussion will show impaired resonance or dullness depending upon the degree of congestion or consolidation. Auscultation will reveal crepitant rales at the onset. As the disease advances the breath sounds become bronchovesicular and subcrepitant rales appear. Over consolidated areas the breath sounds are bronchial. Vocal resonance is increased.

The patient rapidly becomes emaciated and exhausted. The duration may vary from a week or two to a few months.

Chronic Pulmonary Tuberculosis

Definition.—This is the most common form of pulmonary tuberculosis. It usually begins in the apex of one lung and has an insidious onset. If the disease progresses, the opposite lung becomes similarly involved.

Adjustment.—Upper dorsal, C. P., and K. P.

Pathology.—Tubercles usually first form in the apex of the right lung and may make considerable progress before indication. In due time the apex of the left lung is involved by infiltrated tubercles. These tubercles tend to coalesce and form larger lesions known as nodules. The nodules tend to undergo caseation and form cavities. When cases are arrested, the lesions undergo fibroid degeneration and may become calcified. The scar tissue as well as the calcified lesions readily show on X-ray. These two degenerative changes are favorable since they arrest destructive types of degeneration.

Symptoms.—The symptoms are divided into two stages, the incipient stage and the advanced stage. During the incipient stage the disease is often called **incipient phthisis**; in the advanced stage it may be called **chronic phthisis** or **consumption.**

The **incipient stage** makes its onset insidiously, the patient being unable to recall when the first sign of the trouble began; in fact, he does not realize that he is the subject of tuberculosis until the symptoms are well advanced. Usually the patient has had a chronic, dry cough of long standing, a poor appetite, and general weakness. The weakness steadily increases with languor, malaise, pallor of the face, and difficult breathing upon exertion. The cough is more pronounced during the morning and is accompanied by a scanty, glairy expectoration. As the case advances the expectoration becomes more copious and the cough more frequent; there may be hemoptysis, or the sputa will be blood streaked at times. In progressive cases the appetite fails to improve, and there is loss of weight. The temperature exceeds 98.6 degrees during the afternoon and evening, and there may be sweats in the

early morning hours as the fever subsides. Progress of the disease is indicated by a further rise in the temperature, loss of weight, and rapid pulse and respiration.

The advanced stage is marked by a persistent cough, which is continuous throughout the day but is more marked in the morning; profuse mucopurulent expectoration, which may be blood streaked and at other times is greenish or gray; severe anorexia; and occasional vomiting. Hemoptysis from the erosion of a pulmonary vessel is common during this stage; yet many advanced cases have never experienced pulmonary hemorrhage. Thoracic pain occurs when the pleura is involved. The respirations vary from twenty to thirty per minute, while the pulse rate varies from 100 to 130. The fever is the hectic type, being present in the afternoon and evening. The morning temperature may be subnormal, while the afternoon temperature may be 103 degrees or over. As the disease progresses, the temperature may be above normal continuously. Blood examination will show a reduction in the number of red cells which is responsible for the pallor. One or both cheeks may be flushed, depending upon whether the disease is unilateral or bilateral; this is explained as being a vasomotor reflex. Emaciation may be very extreme in advanced cases.

Upon inspection the clavicle, scapula, and ribs are very prominent, giving rise to the characteristic phthisical chest. The supraclavicular and infraclavicular spaces are prominent and deep; the ribs are close together; and the scapulæ project. There is a rounding of the shoulders and a marked prominence of the upper dorsal vertebræ. During inspiration there is intercostal retraction on one or both sides. Palpation reveals increased vocal fremitus over the affected portion of the lungs. The percussion findings consist of dullness where the lung is consolidated and impaired resonance in areas involved to a lesser degree. If a superficial cavity exists, the percussion note is tympanic. Auscultation reveals prolonged breath

sounds during expiration and crepitant rales during inspiration in the early stages. As the lung becomes more dense, the breath sounds will become bronchovesicular or bronchial in character. Exudate in terminal bronchioles will cause subcrepitant rales. Larger masses of exudate in the larger bronchi will cause bronchial rales. When a lung cavity develops, a cavernous rale will be heard; this rale may be transmitted considerable distance beyond the cavity, varying with the conductivity of the surrounding lung tissue.

Prognosis.—In the earlier stages cases respond well to corrective adjustments, rest, good food, and proper hygienic environment. Occasionally advanced cases may be arrested. When arrested the lesions undergo fibroid changes, and at a later period calcareous changes may be shown. The extensive changes of this character diminish the elasticity of the lung and impair its expansion; yet these cases may be said to live comfortably. Early detection and proper management of these cases is highly essential in keeping the mortality low.

Fibroid Phthisis

Definition.—Fibroid phthisis is a form of tuberculosis localized in one lung in which the diseased area is surrounded by a fibrous wall of connective tissue. This is also known as **sclerosis of the lung** and **cirrhosis of the lung.**

Adjustment.—Upper dorsal and K. P.

Pathology.—This form of tuberculosis is circumscribed by a development of connective tissue which separates the diseased area from normal lung. The process may be arrested but can be activated by severe colds, pneumonia, or acute illness. The fibroid changes may continue until the lung structure resembles that of a chronic interstitial pneumonia. If the tubercular process had been arrested, there is no need for treatment since elasticity cannot be restored to the fibroid lung. The aim of treatment is to arrest the destructive process. The chest may show deformity when the fibroid condi-

Fibroid Phthisis usually only 1 lung effected.
in advanced cases both lungs effected

tion is extensive. This deformity is not correctable since it is adaptive to diminished expansion of the diseased lung.

Symptoms.—The patient has little or no knowledge of the beginning of this disease. He may recall having a dry hacking cough of long standing which is aggravated by colds during the winter months. Most of these patients are underweight and slightly anemic. The expectoration is not copious unless an abscess forms and perforates into a bronchus. Cavity formation produces paroxysmal cough, occurring during the morning and evening upon arising or retiring. A change in posture induces the attack of cough which then empties the cavity. The skin on the affected side above the second rib will show distinct atrophic changes. This also involves the subcutaneous tissues and accounts for the reduction in size of the muscles. The spine develops a rotary scoliosis, the concavity of which is toward the affected lung. The opposite lung becomes emphysematous and gives the characteristic physical findings. The heart may be displaced from the side of the emphysematous lung. The condition is usually detected by means of physical examination supplemented with radiographs of the chest. The course may be long; some cases recover when the tubercular process is arrested, while in other cases the disease progresses over a period of many years.

Tuberculosis of the Peritoneum

Tuberculosis of the peritoneum is secondary to primary tuberculosis elsewhere in the body. Tuberculosis of the intestine or ovary invariably is associated with involvement of the peritoneum.

Adjustment.—Adjustments are indicated locally in the zone of the peritoneum involved, and special attention should be given the innervation of the organs of digestion and elimination.

Pathology.—Tubercles and nodules may be found throughout the peritoneum. The tubercles appear as small gray granulations, while the nodules may become extensive and be pal-

Hippocratic countenance = very anxious appearance of person near death.

pated through the abdominal wall. Tubercular lesions including ulcers may develop in the intestine, thereby causing intestinal symptoms to modify the clinical picture.

Nerve Tracing.—Tenderness may be detected in the lower dorsal and lumbar area of the spine becoming diffuse over a large part of the abdominal wall.

Symptoms.—Before peritonitis develops, the patient will have a clinical history indicative of a tubercular infection. He may be emaciated and anemic or may display temperature above normal. Cough and expectoration is present if the primary focus is in the lung. If in the intestine there are digestive disturbances often with alternating constipation and diarrhea. When the peritoneum becomes involved, there are abdominal discomfort, friction pain, hippocratic countenance, a tendency to sigh, and abdominal distention. Profuse effusions into the peritoneal cavity are not uncommon. Lymphatic glands may become enlarged and be palpable as are the nodules. The temperature steadily increases until reaching 103 to 104 degrees. Intestinal obstruction is a hazardous complication indicated by tympanites and fecal vomiting. Symptoms of collapse or internal hemorrhage are a serious indication.

Tuberculosis of the Ureter, Prostate Gland, and Bladder

Tuberculosis affects the ureter, urinary bladder, or prostate rather infrequently. The kidney, testicle, or ovary also may be involved. There is deep-seated pain in the abdomen which radiates toward the bladder. The urine is often cloudy and may contain albumin, blood cells, pus, and destroyed epithelium. When the bladder is affected, there are marked vesical irritability and frequent incontinence due to the swelling of the bladder lining which prevents normal function of the sphincter vesicæ. Laboratory methods must be depended upon in the recognition of tuberculosis of the ureter, bladder, or prostate.

TB in cervical area the lymph glands are always involved. When in cervical glands - TB is elsewhere in thoracic area.

Tuberculosis of the Cervical Glands

Tuberculosis of the cervical glands may result from absorption of tubercle bacilli through the lymphoid tissue of the throat. Tubercle bacilli may reach the cervical lymph nodes through the lymphatics draining other tuberculous lesions or by metastasis through the blood stream. These cases are benefited by indicated adjustments in the cervical region in combination with middle and lower dorsal regions. Proper management as regards rest and nutrition is important to build up body resistance in overcoming the disease process.

Pathology.—The lymph nodes are discrete when first enlarged but tend to coalesce at which time they become decidedly indurated. The tubercular mass may undergo a process of softening, forming an abscess. Permitted to follow its natural course the abscess perforates and drains.

Nerve Tracing.—Detection of tenderness leading from cervical foramina is of value in determining the location of nerve interference. It may be caused by disrelationship of any cervical vertebra.

Symptoms.—The first symptom is enlargement of glands in the cervical region. As a rule, then cervical lymph nodes are affected; but occasionally a salivary gland is involved, notably the submaxillary. These enlarged glands are easily palpable and usually visible. Upon the coalescing they become firmly matted; the overlying skin appears stretched; and rotation of the cervical spine is limited. Softening of the tubercular lesions produce toxemia indicated by changes in the body temperature. The morning temperature is usually subnormal and the afternoon and evening temperature above 99 degrees with a proportionate quickening of the pulse. The patient becomes anemic and loses weight. The appetite is poor and the bowels inactive. Attempted movements of the neck are painful, and often the glands become adherent and immovable under the skin.

pyelogram = injecting dye to determine kidney trouble.
used for kidneys only & believe.

Tuberculosis of the Kidneys

Definition.—This is an abnormal condition of the epithelium of the kidney in which there is inflammation and the formation and degeneration of tubercles.

Adjustment.—The specific adjustment in tubercular pyelitis or tubercular nephritis is K. P.

Pathology.—The tubercles are located upon the mucous membranes of the pelvis or the uriniferous tubules. The function of the kidney is gradually lost due to obstruction of the tubules and impaired nutrition of the organ. Urinary changes are of value in detecting the location of this condition.

Nerve Tracing.—Digital examination of the lower dorsal area reveals tenderness extending from lower dorsal foramina which becomes diffuse over the region of the kidney.

Symptoms.—The symptoms are largely latent in the early stages. As a rule, the patient is underweight and may have occasional vesical irritability. The examination of the urine at this time may reveal four to ten pus cells per high powered microscopic field. This finding alone is not proof of kidney disease. More advanced cases have additional loss of weight and complain of backache or abdominal pain. There is an increase in the frequency of urination. Examination of the urine reveals epithelium from the kidney or its pelvis; in addition pus cells number ten or more per high powered field. The patient is sensitive to cold and usually feels chilly in the late morning or about midday. The characteristic fever appears in the afternoon and terminates with a sweat at night. Cystoscopic examination permits obtaining urine from each kidney separately; in this way the disease may be localized. A pyelogram will reveal which kidney is still functioning. Hemorrhages may occur from the kidney making the urine chocolate color or reddish; yet many cases of renal tuberculosis have no hemorrhage, and many cases of hematuria are not tubercular in origin.

Herpes labialis = cold sore.

Febricula or Ephemeral Fever

Definition.—Febricula or ephermeral fever is a simple fever of a few days' duration, terminating by crisis from the first to eighth day.

Adjustment.—C. P. and K. P. The adjustment at C. P. decreases heat production, and the adjustment at K. P. increases heat dissipation and elimination of poisons from the body. There is no localized pathology, hence no nerve tracing.

Symptoms.—The onset is abrupt with headaches, flushed face, dry and coated tongue, excessive thirst, anorexia, nausea, and vomiting. The fever may be preceded by a sensation of chilliness, after which it is of the continued type and varies from 100 to 105 degrees. The bowels are usually constipated; and the urine is scanty and highly colored; the skin is dry and hot; and there may be herpes labialis. If the fever is high, cerebral symptoms may be present, consisting of delirium and stupor.

The fever terminates by crisis within a week, often lasting but one day. The condition affects those of all ages but particularly children.

Tetanus

Definition.—Tetanus is an acute febrile disease characterized by tonic spasms of the muscles of the face, spine, and extremities.

Adjustment.—Atlas, C. P., and K. P.

Bacteriology.—The bacterial agent in tetanus is the Bacillus Tetanus. This organism abounds in the soil and in the excreta of domestic animals. It usually enters the human body through an abrasion of the skin. The Bacillus Tetanus is an anærobe. The incubation period is from one to two weeks.

Symptoms.—Tetanus has a sudden onset with fever, headache, spinal pain, and stiffness of the muscles of mastication.

Contraction of the masseter and temporal muscles produce trismus from which the disease obtains its common name, lockjaw. The second or third day the fever attains a degree of hyperpyrexia which is accompanied by cervical retraction or opisthotonus. Involvement of the respiratory muscles is serious. Toxemia is the usual cause of death.

Encephalitis Lethargica

Definition.—Encephalitis Lethargica is an acute febrile disease characterized by progressive lethargy, stupidity, and stupor. It is also called the sleeping sickness, grippal catalepsy, and epidemic coma.

Adjustment.—Upper cervical in combination with C. P. and K. P.

Pathology.—The structural changes are those of inflammation of various centers of the brain, the distribution of which is not constant. There are hyperemia of the cerebral vessels and a slow vascular exudation of serum in the surrounding structure. The edematous cells become disorganized and lose their function. Occasionally these changes extend to the gray matter of the spinal cord.

Symptoms.—The most frequent and prominent symptoms are marked lethargy and stupidity. In the early stages the temperature may vary from 100 to 103 degrees. In many serious cases the fever develops after the disease has progressed several days. The patient grows more dazed and stupid and sleeps for days at a time unless great effort is made to arouse him from his stupor. In the initial stage there are pain in the eyes, vertigo, headache, and diplopia. The patient often moves his arms around in a purposeless manner, constituting a peculiar form of subsultus tendinum.

In the advanced stage the patient is unable to make any voluntary muscular movement due to a complete general paralysis. The face becomes pale and because of the double facial paralysis has a peculiar mask-like expression. Delirium

is common during the night. Rare cases chatter rapidly in a hysterical manner, indicating marked alteration in the mental state. Cases of this type have been designated as talking sickness.

Before the development of the paralysis there are often muscular rigidity, pain, and tingling in the extremities; later numbness and sensory paralysis develop. In fatal cases the coma is profound.

American observers lay great stress on the fact that at least 50 per cent of the cases in this country show a history of influenza, and it is the opinion of Dana that it is but an aftermath of this disease. Grippal catalepsy is the name applied by the English to a similar disease which followed the epidemic of 1890. It had a low mortality as have all similar outbreaks. Nona or la nona is the name applied to the same condition which appeared in Australia during the year 1889. Like all other appearances of the disease it followed influenza. The mortality in the American epidemic of 1918-19 was 15 per cent.

Anthrax

Definition.—Anthrax is an infectious disease caused by the Anthrax Bacillus characterized by high temperature and the development of pustules.

Adjustment.—C. P., K. P., and local in the zone of the infection.

Bacteriology.— The Anthrax Bacillus enters the body chiefly through cuts in the skin but occasionally through the pulmonary and gastro-intestinal tracts. It is an ærobic bacillus and is readily cultivated and stained. Since this disease is chiefly one of animals, it is usually transmitted to men by the handling of animal products, chiefly the wool and skins of infected beasts. Incubation period is three days to one week.

Pathology.—One or several pustules develop at the site of inoculation. At first this pustule contains bloody serum and

cells. The cells suppurate, and the pustule breaks down leaving an ulcer. The surrounding tissue is hyperemic and infiltrated with inflammatory products. The neighboring lymphatics are enlarged, and superficial lymph glands are indicated by red lines.

Symptoms.—This is also known as hostler's disease, rag picker's disease, wool sorter's disease, and weaver's disease. There are two forms, the internal and external form. The internal form is very severe and usually fatal. It begins with a sudden chill, followed by a rapid rise in the body temperature to 105 degrees. The pulse is rapid and weak; there are vomiting, diarrhœa, and extreme prostration. The patient passes into the typhoid status with delirium, stupor, and coma; and death may result within 24 hours.

The external form begins with the formation of a small painful papule at the site of inoculation. The papule becomes transformed into a vesicle of dark color containing bloody serum. The vesicle becomes purulent, breaks down, and forms an ulcer. The surrounding tissue is hyperemic and edematous. There are great thirst, vomiting, diarrhea, and rapid pulse and respiration, accompanied by cerebral symptoms. Cases with a favorable outcome begin improving with the sloughing of the ulcer. The fever subsides by lysis and recuperation is slow. Unfavorable cases terminate between the fifth and eighth day.

Hydrophobia

Definition.—Hydrophobia is an acute infectious disease transmitted to man by the saliva of a rabid animal. The condition literally means fear of water because the sight of water or food induces a spasm in the muscles of deglutition.

Adjustment.—Upper cervical, C. P., and K. P.

Bacteriology.—There is no known organism in this disease; yet the disease is transmitted and is, therefore, believed to be

due to a specific filtrable virus. It is transmitted to man through the bite of a rabid animal. The period of incubation varies from one week to three months.

Symptoms.—The symptoms are divided into three stages: initial stage, stage of excitement, and stage of paralysis.

The **initial stage** begins with headache, mental depression, malaise, anorexia, insomnia, slight fever, and difficulty in swallowing, after which there is the gradual merging into the second or excitable stage.

During this **second stage** the patient is restless and excitable, and the symptoms are increased upon noises and the sight of water. The skin is sensitive, and there is hypersensitiveness of the special senses. The throat stiffens, and there are paroxysms of esophageal spasm of great severity, which are increased upon the sight or suggestion of water. With these paroxysms the breathing is difficult from the contracted respiratory muscles, causing cyanosis. There are wild delirium and maniacal excitement, but during certain intervals these cerebral symptoms may entirely subside. Favorable cases show evidence of recovery in three to five days, while unfavorable cases pass into the paralytic stage.

In the **paralytic stage** the patient passes into a state of coma with general muscular relaxation, and death occurs in a few hours or days.

Hydrophobia usually follows the bite of a rabid dog, wolf, fox, cat, or cow. Too often the animal is destroyed before the presence of rabies has been proven. It is profitable to isolate the animal for observation for a week or ten days. If at the end of this time the animal appears well, it can be assumed that he was not infected with rabies. If, however, he has died or has shown evidences of convulsions or paralysis, it may be assumed that he has hydrophobia; and proper prophylactic treatment should be provided the patient.

Lyssophobia is a form of pseudohydrophobia found in hysterical patients who may have been bitten by a dog but in

which hydrophobia does not develop. It is a morbid fear of becoming rabid.

Gonorrheal Arthritis

Definition.—Gonorrheal arthritis is a form of localized or diffuse arthritis accompanying gonorrhea and caused by the gonococcus.

Adjustment.—Middle dorsal, K. P., and lumbar.

Bacteriology.—The Gonococcus of Neisser is the micro-organism of this disease. These cocci are found in pairs and within the pus cells of the exudate. The incubation period is usually four days but may be protracted far beyond this time. The gonococcus is an ærobe and a faculative aneorobe. It may be carried by the lymph and fluids of the body, or it may extend along the course of the mucous membrane to remote portions of the body. Through these processes it may invade the prostate, bladder, ureters, pelvis of kidney, fallopian tubes and ovaries, the joints, and sometimes the endocardium and skin.

Pathology.—Gonorrhea is a specific inflammation usually affecting a mucous membrane. The affected membranes become congested and discharge a profuse yellowish exudate. Prolonged inflammation may lead to ulceration and the development of stricture upon healing. Microscopic examination of the discharge is usually sufficient to detect its nature. In chronic cases the bacteria may disappear, but the discharge continues. The discharge then is no longer purulent; such a condition is known as gleet.

Gonorrheal arthritis does not attack a large percentage of cases having gonorrhea. This often occurs in cases that are self-treated and in which rapid cures are used. Many so-called rapid cures consist of powerful astringents which lessen the discharge from the mucous follicles and promote its absorption into the blood stream. In this way the infection may be conveyed through more remote parts of the body. One or several joints may be involved with the greatest ten-

dency to develop in joints that have previously been injured; thus a previously sprained ankle and dislocated knee are vulnerable locations for gonorrheal arthritis. The congestion and infiltration in and around joints are attended by marked enlargement, limitation of movement, and muscular contractions. Occasionally the articular cartilage is destroyed, and ankylosis develops. Other cases recover without joint deformity.

Symptoms.—Any mucous membrane infected by the gonococcus becomes congested, is markedly swollen, and has a mucopurulent discharge. If situated in the urethra, there may be dysuria. If of the eye there are pain and photophobia. If in the vagina the discharge is very profuse, and there are pruritus and some pain. Adjacent lymph nodes become enlarged and tender. In the male cystitis and prostatitis are common complications that result from the spreading infection. In the female cervicitis, endometritis, salpingitis, and ovaritis are possible complications. When the inflammation spreads extensively, there may be fever and other constitutional symptoms. When localized, fever is uncommon. Gonorrhea is not self-limited; therefore, the duration is variable depending upon the success of treatment applied. The gonococcus has an optimum temperature about that of the human body and is readily sterilized by a temperature of 107.6 degrees continued for twenty minutes. Therapeutic use of heat in the treatment of gonorrhea should be employed by those who are qualified. Complicating conditions may be encountered in which heat is contraindicated.

The gonococcus is both an ærobe and a facultative anærobe. In a favorable environment it may live in the blood stream and be conveyed to remote parts of the body, particularly the joints. The affected joints become decidedly swollen, red, and painful and have limited movement because of muscular contractions. If extensive, there will be fever with its accompanying symptoms. Usually there is general pruritus and often an eruption consisting of small discrete vesicles. The smaller

joints rarely become stiff due to ankylosis; but when an arthritis is extensive and involves large joints, ankylosis is apt to occur. Ankylosis is more apt to involve a knee joint because of its larger size and also because drainage is resisted.

Syphilis

Definition.—Syphilis is a chronic disease of slow progress characterized by an initial lesion, the chancre, and in the advanced stages by cutaneous eruptions and visceral lesions.

Bacteriology.—The Spirocheta Pallida also known as the Treponema Pallidium is the bacterial agent of this disease. It is classed as a protozoon. It is a very delicate thread-like organism, spiral in shape and tapering at each end to a sharp point. It has been found in all syphilitic lesions and in all stages of acquired syphilis. The period of incubation is usually three weeks but may vary from ten days to eight weeks. It is usually transmitted by direct contact but may be transmitted through the medium of public drinking cups, towels, and lead pencils.

Pathology.—The hard chancre may consist of a papule, a scaly patch, or a superficial erosion situated upon a indurated base. It is highly inflamed and somewhat painful. Invariably this lesion undergoes ulceration and discharges pus. The adjacent lymphatics become enlarged. The chancre usually persists from six weeks to three months. Shortly thereafter mucous patches may develop in the mouth and a series of eruptions upon the skin. Cutaneous eruptions tend to persist throughout the secondary stage which may last to the end of the second year.

In the tertiary stage syphilis may become localized in an organ or several organs. When located in the liver, spleen, or other glands there is a marked increase in the amount of connective tissue of the organ; the capsule becomes thickened; and syphilic gumma usually develops. The gumma has about the same histology as the tubercle. In the center there is an

accumulation of closely packed sunken cells, fat granules, cholesterin, and a little fibrillated tissue. Surrounding this center there is a layer of epitheloid cells situated in meshes of connective tissue fibers; and upon the outside forming the third layer there is an accumulation of leukocytes with a few epitheloid and giant cells, all of which are surrounded by connective tissue.

In older gummas the substance is arranged into two layers, an inner or soft layer and an outer or fibrous layer which is dense and hard. Many of these small growths may coalesce to form a large nodular mass, which frequently softens and undergoes suppuration with the formation of yellowish pus.

Lesions in tertiary syphilis may be confined to bone, glands, skin, or nervous system. There is a marked tendency for the lesions to become necrotic when affecting bones and skin; but when involving the nervous system and the vascular system, there is a tendency toward extensive fibroid changes as found in aortitis, arteriosclerosis, locomotor ataxia, and paresis.

Symptoms.—The symptoms can be divided into three stages: primary, secondary, and tertiary. The initial or primary stage is characterized by the formation of a hard chancre occurring at the point of inoculation. This is usually upon the prepuce of the male or the vulva of the female. At the onset this chancre looks like a papule situated upon an elevated base which is indurated. The papule becomes eroded and forms an ulcer. The glands in the region of the ulcer become painlessly enlarged and hard but decrease in size upon the healing of the ulcer to enlarge again during the secondary stage.

Two or three months after the disappearance of the symptoms of the initial stage the symptoms of the secondary stage are manifest.

The secondary symptoms begin with the constitutional disturbances consisting of a slight fever of 102 degrees or less accompanied by headache, backache, sore throat, general

95% diseases of aortic valve is traced to syphilis.

alopecia = bald head,
onychia syphilitica = condition of fingernail.

weakness, and a painless enlargement of the lymphatic glands of various parts of the body. Those of the groin enlarge first, later the cervical, axillary, popliteal, and other groups. The enlarged glands remain separate and are not tender, all of which tends to differentiate them from tubercular glands.

The skin develops a series of eruptions known as syphilides. The macular syphilid is a small red spot neither elevated nor depressed which is noticeable after bathing in hot water or flushing of the skin from other cause. These macules are dull red in color and gradually fade, finally becoming copper colored at which time they are known as the copperous syphilides. The papular syphilid is known as syphilitic acne. The papules may be small or large; they are distributed over all parts of the body. They are of long duration and undergo changes slowly. They are often transformed into pustules which upon healing leave a scar. The skin is dry, rough, and itchy; and syphilitic alopecia appears. Syphilitic onychia may destroy the finger nails or cause them to have ragged edges which bleed upon trivial injury. Syphilitic periostitis tends to develop on the shaft of long bones, particularly the tibia and clavicle. A secondary anemia develops and is commonly known as syphilitic cachexia.

The **tertiary** stage may not appear for many years after the disappearance of all secondary symptoms. Tertiary lesions consist of eruptive sores, nodules, or gummas which may develop upon the skin, in the structure of internal organs, or in bones. Nodules and gummas tend to break down forming ulcers. When attacking the larynx portions of cartilage may be discharged. When the nose is involved, there is an offensive odor (ozena) and destruction of bone which permits deformity. Cavities may develop in the cranial bones or those of the face as well as other bones in the body. Vision is destroyed by lesions which attack the eyeball or by optic atrophy. When the central nervous system is attacked, there may be partial or complete paralysis with or without insanity.

Wide spread nerve tissue syphilis.

Vincent's Angina

Definition.—Vincent's angina is an acute infectious inflammation involving the mucous membranes of the throat and mouth characterized by superficial ulcers.

Adjustment.—Condyle or cervical in conjunction with K. P.

Bacteriology.—There are two forms of this condition, the ulcerative in which are found the Fusiform Bacillus and the Spirillum of Vincent. The Spirillum of Vincent is also known as the Spirochete Darticola. The Diphtheroid variety in which is found the fusiform bacillus alone occurs in about 2 per cent of the cases. This disease occurs chiefly in young adults. Bad mouth hygiene is said to be a favorable factor in the development of this disease.

Symptoms.—This disease begins with headache, slight fever, sore throat, and fetid breath. The temperature increases during the first two or three days with quickening of the pulse and respiration. The cervical lymphatics are enlarged and the neck becomes stiff. Inspection of the mouth reveals superficial ulcers covered with patches of pseudomembrane occurring upon a reddened base. These patches may be confined to the tonsils but usually involve all membranous surfaces of the mouth. This is not a self-limited disease and may continue for weeks or even months. Thorough cleansing of the mouth is an important part in the care of this disease.

Malta Fever

Definition.—This is an acute infectious disease characterized by periodic attacks of irregular fever, profuse sweats, pains in the joints, and enlargement of the spleen. It is also known as Undulant Fever, Rock Fever, Mediterranean Fever, and Goat Fever.

Adjustment.—Middle dorsal, lower dorsal, and lumbar.

Bacteriology.—The micro-organism of this disease is the Micrococcus Melitensis of Bruce. On the island of Malta

cattle - lung's disease

where this disease occurs endemically, it is believed to be conveyed by goat's milk, the goat being immune to the disease. In the United States it is believed to be transmitted by the milk of cows suffering from an infectious disease of cattle known as Infectious Abortion or Abortive Fever. The portal of entry to the human body is through the alimentary tract. The bacteria become localized in the liver, spleen, lungs, and intestines.

Pathology.—Inflammatory changes have been noted in the region of the spleen, lungs, and intestines. The affected areas become hyperemic, swollen, and undergo the process of softening.

Symptoms.—The period of incubation is from one week to three weeks. The onset is slow with malaise, languor and lassitude, headache, restlessness, and marked prostration. There is a gradual rise in temperature for three or four days, during which time the temperature curve is typical of a remittent fever. When the temperature subsides, there is profuse sweating. When it rises, the skin is hot and dry. In a few days the temperature decreases and the fever symptoms subside. The spleen and liver may remain somewhat enlarged and tender. The bowels may be costive and have intermittent diarrhœa.

In two to four weeks there is a recurrence of the febrile attack with the same symptoms as previously mentioned. In severe cases these remittent attacks continue for several months and may continue for a year. The majority of cases recover, the mortality being less than 5 per cent. Pneumonia and anemia are complications; the former proves fatal more often because of the debilitated state of the patient.

SECTION II—CHAPTER IV

DISEASES OF THE KIDNEYS

Urinalysis

By DR. L. M. KING

Urine is the fluid excretion of the kidneys. It consists normally of several solid wastes dissolved in water. Under pathologic conditions, especially of the urinary tract, it usually contains abnormal ingredients and shows an alteration in normal substances. The physical features characterizing urine should be noted in all urine examinations. The most important of these are as follows:

1. Quantity—The normal adult voids approximately three pints every twenty-four hours. Any marked change above or below this quantity that is not related to eating or drinking donates some form of pathology.

2. Odor—This is normally characteristically urinous or aromatic. Such items of food as onions, asparagus, and garlic impart a characteristic odor. The common pathologic odors are those of over-ripe apples or new mown hay present in some forms of diabetes mellitus, also putrid or ammoniacal due to decomposition.

3. Consistency—A watery consistency is normal. It may be thickened by bile, blood, pus, and sugar. The latter substance many times renders the urine thick and sticky like syrup.

4. Color—Freshly voided urine should be yellow or light brown in color; pale, red, green, blue, greenish blue, and milky urines are encountered in pathologic processes occasionally or from medication administered to the patient.

5. Appearance—The unspoiled urine of healthy individuals

is clear on voiding. Cloudy urines denote usually the presence of excessive urates, phosphates, blood, or pus. Chemical tests discussed later will permit the accurate determination of the offending agent.

6. Specific Gravity—A twenty-four-hour specimen ranges from 1.015 to 1.025 in specific gravity. Persistent low or high figures with the patient on a balanced diet denotes pathology. In this case a complete check of the urine is desirable to disclose the cause.

7. Reaction—Normal urine is acid in reaction to the extent of thirty to forty degrees when tested by the acidimeter. Lower readings are characteristic of those who eat little or no acid-forming foods. Higher figures signify an excessive acid-producing diet or a wasting of body tissues.

Chemic composition of normal urine: The outline appended below shows the ingredients most generally entering into the composition of urine.

I. Liquid (95 to 96%)—Water.

II. Solids (4 to 5%)
- 1. Organic
  - (1) Urea
  - (2) Uric acid
  - (3) Creatinine
  - (4) Xanthine
  - (5) Hypo-Xanthine
  - (6) Hippuric acid
- 2. Inorganic
  - (1) Chlorides
  - (2) Sulphates
  - (3) Carbonates
  - (4) Phosphates

III. Gases—Small amounts of nitrogen and carbon dioxide.

The two most important solids of urine are urea and chlorides. A quantitative determination of each supplies useful information when considered in relation to the other findings.

Abnormal Urinary Ingredients: All inflammatory diseases of the urinary and, to some extent, the generative tract as well discharge pathological materials into the urine. Within limited bounds other disease processes of these parts also alter the composition of urine to recognizable degrees. In addition a few diseases having no direct connection with the urinary organs produce detectable changes in the urine. Examples of this type are diabetes mellitus, hepatic insufficiency, gall duct obstruction, and gastro-intestinal impairments. The pathologic ingredients commonly encountered and the probable origin of each appear below:

1. **Albumin.**—Generally this arises from inflammation of the kidneys or other urinary structures. Less common causes are generative organ inflammation, blood pathology, exertion, and exposure.

2. **Bile.**—Obstruction to the bile ducts (large or small), hepatic insufficiency, or excessive production of bile pigments from extensive blood destruction generally is denoted by this substance.

3. **Sugar.**—Glucose appears transitorily following heavy carbohydrate meals or excessive intake of alcoholic beverages. Pathologic causes for glycosuria are pancreatic, hepatic, thyroid, pituitary, renal, and adrenal disease. True diabetes mellitus prevails when urine sugar is accompanied by an excess of blood sugar.

4. **Acetone.**—This substance is derived from imperfect oxidation of fats. Any impairment of fat metabolism constitutes a cause. Severe diabetes mellitus is the usual source. Starvation, fevers, autointoxication, and malignancy are other causes.

5. **Diacetic acid.**—The origin of this acid is identical to that of acetone. Its presence signifies a greater interference to fat oxidation than is true of acetone.

6. **Indican.**—Decomposition of protein (food or tissue) within the body accounts for this product. Gastro-intestinal

derangements (functional or structural), faulty detoxicative action of the liver, and destruction of tissue as in suppurative processes are common examples.

7. **Blood.**—Acute inflammations and hemorrhages in the urinary tract from any cause are the usual sources of red blood cells or hemoglobin in the urine.

8. **Oxaluria.**—Many foods contain traces of oxalic acid which is excreted in the urine daily. It tends to combine with calcium to form hard crystals that may be found in acid, neutral, or alkaline urine. Foods which contain an abundance of oxalic acid are rhubarb, tomatoes, chocolate, spinach, beet tops, tea, coffee, and to a lesser extent most vegetables and fruits. The tendency to form kidney stones will be lessened by restricting the intake of those foods having abundant oxalic acid and by restriction in the intake of calcium.

9. **Lithuria.**—This is the presence of excessive amounts of uric acid salts which appear in the urine as crystals. The precipitation of these salts is favored by high acidity, high concentration, and increased amount of uric acid. Foods which are rich in purine bodies are the chief sources of uric acid. Foods that should be avoided are meat of all kinds, fish, game, and glandular structures. When urates are excessive, there is a tendency to develop kidney stones. This tendency is greatly lessened by a dietetic regime which will alkalize the urine.

10. **Phosphaturia.**—Phosphoric acid tends to combine with sodium, potassium, calcium, and magnesium to form phosphates. When freshly voided the urine is cloudy; it clears readily on the addition of acid. Excessive phosphates most commonly develop in infectious diseases of the urinary tract. A reduction in the intake of calcium makes phosphates more soluble. A diet which tends to acidify the urine causes phosphates to disappear provided inflammation is absent. Acidification of the urine is also important in kidney stones composed of phosphates.

11. **Pus.**—These dead white blood cells are discharged from every inflamed area of the urinary tract, whether it be the kidney, ureter, bladder, pelvis of kidney, or urethra. Even some generative tract inflammations produce pus that may appear in the urine. Pus is the microscopic evidence of inflammation, just as albumin is usually chemical proof of its presence.

12. **Epithelial Cells.**—All parts of the genito-urinary system are lined with epithelial cells. These vary in size and shape in each part. Whenever disturbed by inflammation some of them break away from their attachments and are swept out of the body in the urine. Their source can be determined through use of the microscope.

Following is one test each for the important normal and abnormal urinary ingredients. They are all simple, reliable, and approved by recognized scientists.

Chemical Analysis

I. Acidity.

1. Fill the acidimeter to the 10 cc mark with urine.
2. Add 2 drops of a 1% alcoholic solution of Phenolphthalein.
3. Close the tube with a cork and invert several times so as to thoroughly mix contents.
4. Now add decinormal sodium hydroxide drop by drop, inverting tube after addition of each drop.
5. Continue this until the color has changed to a permanent light rose pink, which marks the end of reaction.
6. The degree of acidity is now read off the tube at the the level of the fluid.

In concentrated urine, where the acidity is above 100 degrees, the tube should be filled to the 5 cc mark with urine

and to the 10 cc mark level with water. Where this dilution is made the reading is double; that is, twice the number on the tube at the level of the liquid. The average acidity of a 24-hour specimen is between thirty and forty degrees.

II. Test for urea (hypobromite method):

1. Fill the Doremus ureameter with a mixture consisting of 5 cc of hypobromite solution, 5 cc sodium hydroxide 22½%, 15 cc distilled water.
2. By means of curved pipette carefully introduce 1 cc of urine into ureameter as far as possible. Slowly withdraw pipette and let the instrument stand for 15 minutes.
3. The volume of gas in the top of the tube is an index of the quantity of urea—each mark on the tube (reading from above downward) represents .1% of urea.

III. (a) Albumin (Qualitative):

Heat test with Acetic acid (Qualitative)

1. Fill a test tube one-fourth or one-fifth full of urine and boil.
2. Add 2 or 3 drops of 50% acetic acid (sometimes 6 or 8 if urine is very cloudy).
3. A cloudiness appears if albumin is present, the cloudiness varying with the amount of albumin.
4. The boiled portion should be compared with some of the unboiled urine to prevent overlooking small amounts of albumin.

NOTE: Filtering cloudy urines greatly simplifies this test. Such obscuring substances as urates, phosphates, and bacteria are filtered out, whereas albumin passes through the filter into the urine.

(b) Albumin (Esbach's Quantitative):

1. Fill Esbach's albuminometer to the mark U. with clear urine.
2. Add Esbach's solution to the mark R.

3. Insert cork and invert tube until contents are thoroughly mixed.
4. Allow the tube to stand for 24 hours.
5. If albumin is present it will have formed a yellowish precipitate during this time.
6. The amount is read off the graduated tube at the level of the precipitate. Each line on the tube signifies 1 gram of albumin in 1000 grams, or one-tenth of 1%.

Reactions of Urine to Heat and Acid Test

A. Clear urines:

1. The specimen is clear before boiling, remains clear after boiling. This means normal urine from the standpoint of appearance.
2. The urine is clear before boiling, clouds on boiling, but the cloudiness disappears on the addition of 2 or 3 drops or more of 50% acetic acid. This signifies excessive phosphates.
3. The urine is clear before boiling, clouds on boiling and the cloud becomes more intense as acid is added. This denotes albumin. If the urine contains blood, the albumin will be colored red or reddish brown.

B. Cloudy Urines:

1. The urine is cloudy before boiling, but the cloudiness disappears as the boiling point is reached. Excessive urates are denoted.
2. The urine is cloudy before boiling, becomes clear as the urine warms, but again clouds on boiling and the cloud intensifies as acid is added. This indicates excessive urates and albumin.

3. The urine is cloudy before boiling and remains unchanged on boiling and the addition of acid. Bacteria are signified.

IV. (a) Sugar (Benedict's Qualitative):

1. Place 5 cc of Benedict's solution in a test tube.
2. Add 8 or 10 drops of urine (no more).
3. Boil vigorously for at least 2 minutes and allow to cool spontaneously.
   a. If glucose is present, the entire body of the solution will be filled with a precipitate which may be red, yellow or greenish in tinge. If the quantity be low, that is, under 1.3%, the precipitate forms only on cooling.
   b. If no sugar be present, the solution either remains clear or shows a faint turbidity that is blue in color and consists of precipitated urates.

NOTE: This reagent is about 10 times as sensitive as Haines' or Fehling's. Very small quantities of sugar (as low as .1%) give precipitates of considerable bulk. The positive reaction is the appearance of a precipitate throughout the entire solution, either before or after cooling, causing the mixture to become opaque. Bulk and not color is the basis of the positive reaction.

(b) Sugar (Benedict's Quantitative):

1. To 5 cc Benedict's solution A (No. 40) in a pyrex test tube, add 10 cc water and 2.5 grams crystalized sodium carbonate or 1.25 grams anhydrous sodium carbonate.
2. Heat at boiling point until the carbonate is dissolved.
3. With solution merely boiling add urine a drop at a time from a graduated pipette until just enough

has been added to decolorize the blue Benedict solution.

4. Calculation: The figure 1 divided by the number of cubic centimeters of urine equals per cent of sugar in urine.

   Example: If 4 cc are required, there is ¼ or .25% sugar; if .4 cc is required, there is .¼ or 2.5% sugar.

V. Bile Test (Gmelin's):

1. To 3 or 4 cc nitric acid add 3 to 5 cc of urine. (Urine must be gently overlaid.)
2. In the presence of bile (bilirubin) a green ring forms at the line of contact with adjoining zones of blue, reddish purple, and brown. Green is the positive indication of bile.

VI. Acetone and Diacetic Acid (Nitroprusside test):

1. To 4 or 5 cc of urine add a few grains (.02 of a gram) of finely pulverized sodium nitroprusside and mix until entirely dissolved.
2. Superimpose 1 cc of ammonia on the urine solution by carefully pouring it down the walls of the tube.
3. Let the mixture stand for 15 minutes. At the end of this time a color zone appears between the two fluids.
4. If this zone is yellow or chestnut color, the acetone is within the normal range.
5. If the zone is of more deep chestnut color, there is slight excess of acetone but no diacetic acid.
6. If the zone is violet, there is much acidosis, and in that case the fluid is mixed and acetic acid added drop by drop until the fluid is slightly acid.

7. If the reddish purple tint throughout the whole mixture disappears as the acid is added, much acetone is present but no diacetic acid.
8. If the purple blends into a durable ruby red, there is diacetic acid and as a rule also acetone.

VII. Indican Test:

1. Place 2 cc or more urine into a tube.
2. Add an equal amount of hydrochloric acid.
3. Now add 10 to 20 drops of chloroform.
4. Finally add 2 drops of peroxide.
5. Thoroughly shake mixture.
6. Indican is indicated by the blue color of the chloroform in the bottom of the tube.

NOTE: When potassium iodide has been taken internally, the chloroform assumes a red or reddish color instead of blue due to liberation of free iodine, the depth of the color depending on the amount of indican. If thymol is used as a urinary preservative, the chloroform becomes violet in color.

VIII. Blood (Benzidine test):

1. To 1 centigram (a pinch) of benzidine in a dry test tube add 3 cc of glacial acetic acid and mix.
2. After a moment add 3 cc of hydrogen peroxide.
3. Divide solution into 2 equal portions.
4. To one portion add 1 cc of urine, the other portion serves as a control.
5. If there is any blood or the decomposition products of hemoglobin in the urine, the solution into which the urine is introduced becomes greenish blue.

IX. Chlorides:

1. Add a few drops (3 or 4) of nitric acid to 5 cc of urine.

2. Now add 1 or 2 drops of silver nitrate.

3. Chlorides are normal when a white flaky precipitate forms and without diffusing through the urine quickly sinks to the bottom of the test tube.

   Chlorides are excessive when a heavy precipitate occurs.

   Chlorides are diminished when a mere cloudiness develops and readily diffuses through the urine without the formation of flakes.

NOTE: If more than a trace of albumin is present, it should be coagulated by heat and then filtered off, as it interferes with the test.

Nephroptosis

Definition.—Nephroptosis is also known as movable kidney, prolapsis of the kidney, and floating kidney. When it is possible to displace the kidney slightly from its firmly attached position along the spine, it is said to be **movable.** When the kidney drops from its normal position producing discomfort, it is said to be **prolapsed.** When the kidney has moved considerable from its normal location and is capable of a change in its position with a change in the position of the patient, it is said to be **floating.**

Adjustment.—Since the two structures which tend to maintain the kidney in normal position are the abdominal wall and the fat surrounding the kidney, it is important that spinal adjustments be given in the lower dorsal area to restore tone to the abdominal muscles. Adjustments which improve the nutrition of the patient and permit an addition of weight are effective in replacing the renal fat which supports the kidney.

Symptoms.—When the degree of movability or prolapsis is slight, there may be no symptoms; when more marked, there is pain in the side or in the lumbar region of the back. The

pain tends to radiate diagonally toward the bladder. There is often nausea and sometimes vomiting. The kidney may be detected by manual examination, either in the vertical or supine position. In the vertical position palpation is made by placing the thumb on the back and the fingers below the costal margin and upon the abdominal wall. As the fingers move toward the thumb squeezing the abdominal wall, the prolapsed kidney moves in an arc upward and medianward, the movement being palpable with the finger tips. In the supine position the things should be flexed and both hands employed in the palpation. Since the kidney will occupy its normal position in this posture, it is necessary that an attempt be made to displace it outward and downward. If this is possible it is movable or prolapsed. When pain exists, prompt relief will be given by applying a bandage to afford additional support to the abdominal wall. A folded towel may be inserted under the bandage on the side of the prolapsed kidney; this added pressure raises the kidney and thus relieves the strain upon its supporting tissues.

Recovery is usually prompt in those cases capable of gaining weight and acquiring increased tone in the abdominal wall. When nephroptosis occurs in the presence of a wasting disease or in an extremely lean individual with an atonic abdominal wall, there is little likelihood of permanent improvement.

Renal Congestion

Definition.—Renal congestion is an engorgement of the kidney with arterial or venous blood wherein the affected vessels are distended. **Active congestion** is of arterial origin, while **venous congestion** is due to impaired drainage.

Adjustment.—Active congestion of the kidney is primarily caused by nerve interference in the lower dorsal area. When the congestion is of vasomotor origin, it is purely a neurosis and responds readily to the proper adjustments. When it is inflammatory in character, contributing causes have to be de-

termined and removed. This may require adjustments to various areas of the spine depending upon the nature and location of the contributing cause.

Pathology.—In active congestion the artery walls are distended, bringing more arterial blood into the kidney. The organ is enlarged and decidedly red. The surrounding capsule is subjected to considerable tension productive of pain. In passive congestion the kidney is enlarged and of a dark purple color. It results from a mechanical obstruction in the circulation. Frequently this obstruction is in the heart itself, particularly where valvular defects occur and the heart muscle is in a state of decompensation. In extreme engorgement the constituents of blood may escape into the organ and appear in the urine.

Nerve Tracing.—An area of tenderness, very acute in nature, is invariably found radiating from the tenth, eleventh, and twelfth dorsal zones to the loin region between the eleventh dorsal and third lumbar. The nerve fibers which are tender are superficial sensory nerves belonging to the somatic division of the nervous system.

Symptoms.—Acute active congestion frequently follows exertion, muscular strain, exposure to cold, or the injuries of excessive stimulants. The onset is with fatigue and aching pain in the back. The pain gradually becomes more intense and radiates downward toward the bladder. The bladder becomes irritable, causing increased frequency in urination; the volume of urine is usually diminished; and it invariably contains albumin and blood cells. Pain is greatly increased by movements of the body, particularly those of coughing. The appetite is lost, and the body weight is decreased. If the condition is not corrected promptly, nephritis will result. Passive congestion of the kidney is gradual in onset and devoid of subjective symptoms. The volume of urine voided daily diminishes. The urine is highly colored and usually contains abnormal constituents. This is particularly true in cases of

myocardial failure. Complete anuria may be followed by uremia.

Inflammation of the Kidney

Nephritis means inflammation of the kidney, but the term is applied to acute and chronic inflammatory processes and also to degenerative processes. The distinction between degenerative and chronic inflammatory processes cannot always be determined by the clinical and laboratory picture; hence the term nephritis is often used as a generic term meaning kidney disease.

Clinically nephritis is classified as acute diffuse nephritis, chronic diffuse nephritis, and chronic interstitial nephritis. Pathologically, however, nephritis is classified as glomerulonephritis, which may be acute or chronic; arteriolar nephrosclerosis; nephroses; and miscellaneous nephritides. In diffuse nephritis the glomeruli are necessarily involved both in the acute and chronic form, but the tubules and interstitial tissues do not escape the disease process. The term diffuse nephritis is, therefore, a more practical term than glomerulonephritis.

Acute Diffuse Nephritis

Definition.—This is also known as acute Bright's disease and is an acute inflammation involving the substance of the kidney and impairing the function of its parenchyma.

Etiology.—The primary causative subluxation is usually at the tenth, eleventh, or twelfth dorsal vertebra. The part this cause plays may be little more than lowering tissue resistance in the organ, thereby creating susceptibility to injury by toxic substances. Acute infections of the throat as found in scarlatina, Vincent's angina, and tonsillitis are frequently complicated by the development of acute nephritis; therefore, it may be assumed that the toxic state of the body is an exciting cause. To a lesser extent influenza, acute head colds with sinusitis and cervical adenitis, pneumonia, and measles may

25% will die in acute stage,
75% will recover,
N.P.N. non-protein nitrogenous { urea, uric acid, creatinine + creatin

be contributing causes of acute Bright's disease. When an infectious disease contributes to the production of nephritis, it is important that corrective adjustments be directed toward the cause of those infections. Adjustments in the cervical region and upper or middle dorsal region are secondary in importance only to that of the kidney area.

Pathology.—The kidney is enlarged due to its congestion and edema. It is often called the large white kidney. Its tubules become filled with exudate composed of serum, albumin, fibrin, blood cells, and granular debris. These form casts which become detached and may be found in the urine under microscopic examination.

Symptoms.—The onset may be gradual or sudden. When sudden there is frequently backache or slight pain in the side. The output of urine is abruptly diminished. The face is puffed and somewhat pale. The ankles are swollen late in the day and will pit upon pressure. There is an urinary odor about the body which is easily detected upon entering the sick room. A patient may complain of visual disturbances, difficult breathing, loss of appetite, and vomiting. Examination will disclose elevation of the blood pressure which is of the renal type. Examination of the urine will reveal it to be of cloudy appearance, decreased volume, and increased specific gravity when blood is present. The specific gravity may be below normal when there is no blood because the output of urea is diminished. Serum albumin is usually found upon reliable chemical examination. Microscopic examination reveals the presence of pus cells, often red blood cells, kidney cells, and casts. The casts are usually of the granular or epithelial type.

Cases of gradual onset may present no subjective symptoms until there is observable swelling in the face and legs. These cases have no pain but may feel tired, have poor appetite, and have an occasional headache. Proof of nephritis is obtained by a complete urine test. The vast majority of cases show a distinct elevation in the blood pressure; this increased pressure begins early and is often the first sign in a physical ex-

amination to suggest urinalysis. Blurring of vision is usually due to nephritic retinitis. The fundus of the eye reveals a characteristic picture. Vision may be completely lost prior to the onset of uremia. As uremia develops, the patient passes into a coma with convulsions. The convulsion is usually epileptiform in type, being at first tonic and later clonic in type. It is of a few minutes' duration and is followed by profound uremic coma, having stertorous breathing. Proper management of the case in the early stages usually prevents the development of uremia.

There are three important things to remember in the management of acute Bright's disease: first, adjustments should be given regularly and not less than once each day; second, the patient should be confined to bed and observe absolute rest; third, the intake of food should be decidedly restricted until the condition of the patient has improved. For a few days the patient should be restricted to water and fruit juices. In a few days to this may be added vegetable broth. As improvement is shown; fruits, vegetables, and milk may be added. Acid producing foods and those with a high ash should be restricted until abnormal urine findings have disappeared.

Chronic Diffuse Nephritis

Definition.—This is also known as **chronic Bright's disease.** It is an inflammation of the kidney which includes the parenchyma of the organ.

Adjustment.—K. P. and local zones where there are contributing causes.

Pathology.—The kidney is often large and white because the capsule has become detached and fluid occupies the space beneath this capsule. The blood vessels are hyperemic and the tissue of the organ decidedly edematous. The uriniferous tubules have thickened walls, are dilated in some parts, and are filled with plugs of exudate in other parts. The more

Edema disappears, reduction of intravascular osmotic pressure

chronic the case the more likely is there to be thickened connective tissues in the medullary portion.

Symptoms.—Chronic Bright's disease may have its origin with an acute attack from which the patient did not fully recover, or it may begin as a chronic inflammation and progress slowly over a period of one or two years. There may be a history of repeated acute infections, or there may be chronic infections coexisting. Many of these cases are intemperate in both eating and drinking. Others are subjected to extreme exposure, and a large number do not care for their bodies as though they were delicate machines. In most instances the first symptom is edema. It is most easily detected by a puffiness of the lower eyelids in the morning upon arising which disappears during the course of the day. It is present in the lower extremities in the evening and observed by the patient at the point of his shoetops or by the deep raised marks across his instep. Other patients complain of recurrent headaches, often associated with vertigo and breathlessness upon exertion. These cases usually show a marked renal hypertension. Other cases complain of old age creeping upon them because they can no longer withstand ordinary physical activity but do not complain of specific symptoms. While the blood pressure is raised in most of these cases, the chief evidence of the disease is the urinary findings. The quantity of urine is below normal. The urine is cloudy in appearance. Its gravity is subnormal. Abnormal constituents are albumin, casts, pus cells, and kidney cells. Edema becomes progressive, ultimately producing ascites and hydrothorax. Secondary anemia develops in a large percentage of the cases. The condition may terminate in uremia, or the patient may die as a result of an acute disease superimposed upon the nephritis. As in advanced stages of the acute form, there may be disturbances of vision with retinal hemorrhages, retinitis, and optic atrophy. The duration is variable and but few cases recover. The same routine of regular adjustments, rest, and diet should be observed in handling the chronic case. Starvation diets cannot

dies of uremia in active + chronic stages but not urbanite

beads of sweat are seen under nose,
white - urea crystals - Froth sweat.

3 forms of uremia Page #153
1. cerebral - most common - twitching, coma, stupor.
2. Gastrointestinal - vomit, diarrhea etc.
3. Pulmonary - rare - severe dyspnea

be imposed for long periods of time due to the probability of starvation acidosis.

Chronic Interstitial Nephritis

Definition.—This is also known as arteriolar nephrosclerosis and also sclerosis of the kidney. It is also known as the renal component of cardiovascular-renal disease. It is sometimes called the small red kidney and the small white kidney; its color depends upon whether its capsule is attached or detached from the reddish organ. Interstitial nephritis is a chronic degenerative disease, primarily affecting the connective tissue of the gland which results in hardening and contraction of the organ.

Adjustment.—Adjustments are indicated in the lower dorsal area. Since these patients may also have myocarditis and arteriosclerosis, adjustments that will tend to normalize the metabolic process and maintain efficient elimination should be made.

Pathology.—The kidney is small in size and usually red in color because the capsule is adherent. The connective tissue elements have increased. The cortical area is, therefore, narrow and atrophied. The blood vessels have thickened walls and narrow lumina. The tubules undergo degenerative changes, discharging casts, the nature of which varies with the degree of destruction. In the earlier stages the casts are hyaline; later they may be granular and lastly may be epithelial in character.

Symptoms.—In the early stages of chronic interstitial nephritis there may be no evidence of the disease excepting hypertension. The first symptom to attract the patient's attention is the voiding of large quantities of pale urine of low specific gravity. In the early period of the disease there are no abnormal findings detected by chemical and microscopic examination. In due time, however, traces of albumin with an occasional hyaline cast and an occasional renal cell will be

found. Headaches caused by hypertension are not uncommon. The vision fails in a large number of cases. The fundus of the eyeball may reveal sclerotic changes in the vessels, retina, or disk. The patient tends to become dehydrated and anemic. The loss of weight is moderate. The skin assumes the typical renal pallor, being dry and somewhat scaly. Progress of the disease is slow, and the clinical picture is modified by complications which arise. Apoplexy and various types of the so-called heart attacks are not uncommon. Just as arteriosclerosis and myocarditis are associated with nephritis, so may nephritis be associated with myocarditis and arteriosclerosis. The diagnosis is usually directed to the predominant condition even though the pathology involved both the vascular and renal system. Senile changes in the voluntary muscles, the nervous system, and other organs modify the clinical picture in these cases. In advanced cases the urine may contain albumin, casts, and cells persistently. The output of solids is decreased, and ultimately the volume of water voided is diminished. When this takes place, renal edema develops as in diffuse nephritis. Under careful management with the observance of proper dietary measures life may be greatly prolonged; however, the structural changes are of such a nature as to preclude recovery.

Nephrosis

Definition.—Originally the term nephrosis was applied to diseases of the kidney which were not inflammatory in character. Today nephrosis may be defined as a clinical condition characterized by edema with albuminuria.

The term nephrosis is also applied to the chronic stage of nephritis having edema, amyloid degeneration of the kidney, and syphilitic lesions of the kidney.

Adjustment.—The lower dorsal area should be adjusted according to findings.

Pathology.—Those cases regarded as a true nephrosis may exist without any pathological change in the kidney. It is be-

lieved to result from a reduction in the osmotic pressure which permits the escape of serum albumin. The escape of serum albumin would indicate some loss in the integrity of the blood vessel walls but not necessarily from inflammation or other pathological causes.

Degenerative changes may be found in kidney cells, particularly that type known as amyloid degeneration. It usually results from prolonged suppurative infections located in organs other than the kidney. Chronic osteomyelitis, tubercular spondylitis, a cold abscess, and such conditions are common antecedents of amyloid degeneration. Syphilitic changes may be confined largely to the renal vessels but gradually involve the parenchyma of the organ.

Symptoms.—The onset is insidious with edema that is influenced by gravity. At a later date anasarca develops with ascites and hydrothorax. Edematous portions of the body pit upon pressure, and the fluid in the cavities varies with the position of the patient. The skin becomes waxy and pale. Urinalysis always shows albumin, pus cells, and usually waxy casts. The red cell sedimentation rate is greatly increased. The blood serum protein content is low. The basal metabolism is usually reduced. Sometimes there is lipuria. Cases of true nephrosis are more common in children, most of whom respond readily to adjustments and show rapid recovery. Extensive degenerative changes preclude good results.

Uremia

Definition.—Uremia is a state of toxemia resulting from the retention of urinary constituents. It is the condition which results from renal insufficiency regardless of the causative factors.

Adjustment.—The adjustment should always include lower dorsal, but attention should always be directed to causative factors elsewhere in the spine if they exist.

Symptoms.—The approach of uremia particularly during

pregnancy is indicated by hypertension far in advance of any urinary finding. It may be said that any case of pregnancy having a systolic pressure of 140 or over indicates the approach of uremia. When the systolic pressure exceeds 150, the patient is in the danger zone. These cases often are of sudden onset with deep-seated pain in the back, cloudiness of the intellect, unconsciousness, and convulsions. The convulsion is followed by a profound coma having stertorous breathing; and there may be an elevation of body temperature, but this is by no means constant.

Many cases are of gradual onset with early headaches or paresthesias which greatly annoy the patient. There may be itching of the skin, restlessness, and insomnia. Digestive disturbances are very common. Most cases of uremia develop some degree of anemia. Advanced uremia is indicated by disturbances of consciousness, muscular twitching, or convulsions. It may be said that uremia is the result of renal insufficiency; hence, the prognosis varies with the cause of that renal insufficiency.

Pyelitis

Definition.—Pyelitis is an acute or chronic inflammation of the mucous membrane lining the pelvis of the kidney.

Adjustment.—Since pyelitis is often associated with inflammation of the ureters and the bladder, adjustments should be given in the lower dorsal and lower lumbar areas of the spine.

Pathology.—The blood vessels in the pelvis of the kidney become dilated and permit the escape of the serum and cells. These infiltrate throughout the mucous membrane and submucous tissue. Discrete hemorrhages are common as well as bleeding from the surface. The exudate is composed of mucous, pus cells, fibrin, and blood. In the infectious cases there may be abscesses and necrosis involving the kidney proper. It is usual for these abscesses to drain directly into the pelvis of the kidney.

Symptoms.—Most cases of pyelitis are secondary to infections elsewhere in the body. The infection may be conveyed to the kidney through the blood stream or spread from the bladder by peripheral extension along the ureters. When it is secondary to cystitis, the patient first complains of dysuria and an irritable bladder. Fever of a slight degree may exist. Examination of the urine may disclose pus cells, bladder cells, albumin, and bacteria.

When the pelvis of the kidney becomes involved, there is an increase in the body temperature and considerable pain in the back which radiates obliquely between the bladder and the kidney. Abdominal tenderness may be acute in the renal region and extend to the hypogastric region. Fever may follow an irregular course, particularly when the inflammation is suppurative. Examination of the blood will disclose leukocytosis of moderate degree. As a rule, there is frequent voiding of urine which may be alkaline in reaction. The presence of red blood cells is determined by microscopic examination; but when hemorrhage is severe, the urine may be reddish or dark brown in color. When the inflammation spreads to the kidney proper, the volume of urine is diminished. Edema may develop in those parts of the body influenced by gravity. The chief danger then is uremia. Its approach is noted by the presence of cerebral symptoms including cloudiness of the intellect, delirium, stupor, coma, and convulsions.

Chronic pyelitis is usually marked by mild backache in the dorso-lumbar area of the spine.

Hydronephrosis

Definition.—Hydronephrosis is an accumulation of urine in the pelvis of the kidney caused by obstruction of the ureter.

Pathology.—Sudden obstruction of the ureter influences kidney action and causes anuria. More gradual obstruction produces hydronephrosis. As the cyst increases, the renal tissue becomes thin and stretched. In due time the parenchyma

of the kidney undergoes atrophy and secretion of urine ceases. The ureter may become blocked by the lodgment of a renal calculus; this usually occurs at a point where the ureter is normally constricted. Twisting of the ureter permitted by prolapse of the kidney is rare. Abdominal tumors rarely obstruct the ureter.

Symptoms.—The condition may exist without giving rise to any symptoms if the ureter is partially obstructed and the accumulation small. A history of renal colic may lead one to anticipate the possible development of hydronephrosis. When the accumulation of fluid is large, the kidney becomes prolapsed and produces pressure symptoms. These consist of pain in the back or side of the abdomen which may radiate toward the bladder. Obstructive constipation may result from pressure on the intestines. Examination of the abdomen reveals a palpable enlargement in the area of the transverse colon which fills the lumbar region. A pyelogram should be made in such cases for the purpose of determining kidney function.

When the obstruction of the ureter is partial or intermittent, it may cause intermittent passage of large quantities of urine after which the abdominal enlargement will not be palpable. Unless hydronephrosis is quickly relieved, it will cause considerable destruction of the kidney.

Nephrolithiasis

Definition.—Kidney stones, renal calculus, and gravel are terms frequently applied to nephrolithiasis. Kidney stones are composed of urinary crystals which collect and adhere to one another in the calices of the kidney.

Adjustment.—The removal of nerve interference in the lower dorsal area of the spine tends to preserve normal kidney action and prevent the formation of stones. Pain produced by the passage of a kidney stone is relieved by lower dorsal or upper lumbar adjustments which increase the ac-

Causes: Infection in urinary track - causes a precipitation of urates. High concentration of urinary salts - no differentiate data. Vit A deficiency - loss of epithelial tissue integrity causes precipitation. Parathyroid tumor - increase parathrone (see page 248)

tivity of the sympathetic innervation of the ureter. This is more particularly true when the stone is passing through the first constriction of the ureter at its junction with the pelvis. When the stone is passing through the second or third constriction, relief will be afforded by the adjustment of lower lumbar subluxations or the sacrum when it is found to be subluxated.

Pathology.—The composition of kidney stones varies with the composition of the urine. Most kidney stones are composed of phosphates, urates, or oxalates; however, some stones contain crystals of two or more types. Phosphates are found only in alkaline urine; urates are found only in acid urine; but oxalates may be found in either acid or alkaline urine.

Damage to the kidney by disease, trauma, or dietary abuses, no doubt, is an underlying causative factor in the development of kidney stones. The stone itself must be composed of metallic elements ingested as food or drink. This being true, the chemistry of urinary solids can be regulated in a large measure by diet. Phosphates and urates may be checked in their development and even dissolved by following a diet which alters the chemical reaction of the urine. Since oxalates are found in acid and alkaline urine, it is obvious that the chemical reaction has little to do with their formation. Oxalic acid, essential to their production, is found in many items of food, particularly in rhubarb, tomatoes, chocolate, and cocoa. Smaller quantities are found in most vegetables and fruits. To prevent an increase in size of an oxalate, one would be prudent to avoid all foods containing large amounts of oxalic acid and use sparingly fruits and vegetables containing small quantities of the acid. Microscopic examination of the urine will disclose urinary crystals; and when found to be abundant, these should always suggest a change in the dietetic regime.

Symptoms.—When the calculus is in the calix of the kidney, it does not produce any symptoms; but upon entering the pel-

calculus - generally found in Renal pelvis. More commonly found in male than female. - generally it's ca Oxalate.

vis, it may cause intermittent hematuria without pain. The patient may experience momentary pains in the back or side of the abdomen before the stone enters the ureter. Most kidney stones are rough and irregular in shape. Their sharp processes lacerate the mucous membrane lining the ureter as they are propelled through its constrictions. The pain which arises from this irritation is called **renal colic.**

The pain or renal colic may begin in the lower part of the back or deep in the abdomen where it radiates toward the bladder. The abdominal muscles become contracted. The patient feels nauseated and frequently vomits during the attack. In the male the testicle on the affected side is drawn up by a reflex contraction of the cremaster muscle. The posture of the patient is distorted by the abdominal contractions. Frequently the patient tosses about in a fit of intense agony. The skin is usually pale and the skin temperature below normal. The bladder may become irritated, and the patient may pass small quantities of bloodstained urine.

Should the stone become lodged and its movement arrested, the pain suddenly subsides and returns when the stone again moves. Upon passing through a constriction, a spicule of the stone may become imbedded in the wall of the ureter, thus suspending the stone immediately below the constriction. Between the constrictions the ureter is approximately one centimeter in diameter, and no pain is experienced except when the stone passes through the constriction. The duration of renal colic may vary from a few hours to several days with or without intermissions. A stone may be carried in the ureter for months or years without obstructing it and producing hydronephrosis. There is danger, however, of the irritated tissue becoming infected. The intake of a large amount of water is of value in flushing the stone from its point of attachment. When the pain subsides, the patient usually enters a normal sleep because of exhaustion. Irritability of the urinary tract and muscular soreness due to the contractions may last for a few days.

Differential Symptoms.—Hepatic colic may simulate right renal colic but differs in that there are jaundice, clay-colored stools, pain radiating upward under the right shoulder blade, tenderness over the right hypochondriac region, Li. P. subluxation, and nerve tracing from Li. P. to region over liver.

Right renal colic may also be simulated by appendicitis, but the latter differs in that it is characterized by fever of 102 degrees or over, tenderness at McBurney's point, which is traceable to a lower dorsal or upper lumbar subluxation, indicanuria, constipation, right thigh flexed upon the abdomen, retraction of the abdominal muscles, and dyspena with shallow breathing.

Tumor of the Kidney

Definition.—Tumors of the kidney are rather rare. They may be benign or malignant. Benign tumors include adenofibroma, angioma, and teratoma. Malignant tumors include carcinoma, sarcoma, adenoma, and hypernephroma. = McBurney's tumor

Symptoms.—Unless the capsule of the kidney is stretched by the growth, the first symptom to attract attention is hematuria. The urine may be rusty, reddish, or brownish from time to time. It may occur without pain, but sooner or later dull aching pain develops in the back or deep in the abdomen. As the renal tumor enlarges, it becomes palpable and produces pressure upon adjacent organs. Most renal tumors are irregular in contour and firm in consistency as felt through the abdominal wall. During the earlier stages the renal tumor moves with deep respiration. As it enlarges it attaches itself to adjacent structures and may become immovable. There is a progressive loss or flesh and strength and finally the development of secondary anemia. X-ray and other laboratory examinations are of value in confirming the suspected diagnosis.

2 biggest types tumors of kidney are,
1. Hypernephroma - older individuals - causes cancer of bones, liver,
2. Embryoma - most common abdominal tumor - seen between age 4-5 attains enormous size.

CHAPTER V

EXAMINATION OF THE ABDOMEN

By DR. A. G. HENDRICKS

In a discussion of the abdomen and its examination it is assumed that the student is thoroughly familiar with the anatomy of this region.

The abdomen is divided into areas either nine in number or four in number, depending upon the preference of the examiner. The nine areas are obtained by four lines, two horizontal and two vertical. The upper horizontal line is drawn from the lowermost margin of the tenth rib. The lower horizontal line is drawn from the anterior superior spines of the ilia. The two vertical lines pass through the middle of Poupart's ligaments. Thus, named from left to right and starting with the upper tier we have—the left hypochondriac, the epigastric, the right hypochondriac; the left lumbar, the umbilical, the right lumbar; the left inguinal (iliac), public, and right inguinal (iliac). The more simple method of division is by two lines: one vertical, one horizontal and both passing through the umbilicus. Thus the abdomen is divided into the right upper, left upper, right lower, and left lower regions.

Abdominal Inspection.—Abdominal inspection should, as a rule, be made with the patient in the recumbent posture. If the examiner is doing bedside work, all quilts and blankets should be folded down to the pubic region. The night clothing should then be raised to the lower end of the sternum. Where practicable inspection should be made from the front, sides, and back in order to detect pendulousness, bulging, retractions, pulsations, condition of skin, respiratory movement, and possible distention of blood vessels.

If the skin is smooth, shiny, and taut it is indicative of internal abdominal tension. White streaks in the abdominal wall and the buttocks and thighs are indicative of long con-

tinued abdominal distention from pregnancy, tumor, ascites, or other unusual conditions. In pregnancy deep pigmentation, usually in the linea alba, is common. Circular, scaly copper-colored spots are characteristic of syphilis. Enlargement or scar tissue in the groin is indicative of present or past venereal disease.

General enlargement of the abdominal veins is significant of interference with abdominal drainage resulting from direct pressure upon important abdominal veins. A series of enlarged veins radiating from the umbilicus is particularly significant of portal obstruction. It is obvious that the umbilicus will be depressed in obese patients, while it will be shallow and flattened in those patients with abdominal distention.

It should be remembered that the abdominal type of breathing is more prevalent in men and in children. If abdominal breathing is decreased, it indicates partial or complete immobility of the diaphragm. Reason dictates that this may result from any abdominal abnormality which would lead to pain upon abdominal compression. Such would be the case in peritonitis, appendicitis, subphrenic abscess, ovaritis, etc. The action of the diaphragm may be restricted by enlargement of any of the abdominal viscera or accumulation of gas or fluid in the abdomen.

Abdominal Palpation and Percussion.—Patients vary in their reactions to pain. Therefore, it is well to give attention to the facial expression in making abdominal palpations rather than to accept the word of the patient as to its character or the severity of its sensation. If malingering is suspected, the attention of the patient should be diverted and a thorough test thus made as to the actual presence of tenderness. In severe cases where the abdominal muscles are contracted investigation by palpation will be aided by having the patient flex the thighs and perhaps raising the head and shoulders on pillows.

The palpation should be made by placing the warm hand

flat on the abdomen and employing a circular movement, gradually increasing the pressure. The examiner should not make the error of poking with the finger tips. Such a procedure leads to resistance by the patient. On the contrary a dipping should be made with the balls of the fingers after a reasonably firm pressure with the entire palm of the hand has been established. Sometimes it is advantageous on deep palpation to reinforce the palpating hand with the other hand. In palpating in the lumbar region the examiner should place one hand between the lowermost rib and the crest of the ilium at the posterior while the other hand is employed in exploration. Palpation is of value in determining the enlargement of abdominal organs, displacement of these organs, and tenderness.

Abdominal percussion is of doubtful value. It does serve to determine the surface borders of the liver and the spleen and the upper limits of the stomach. Beyond this point it is chiefly of value in detecting the presence of solid masses in the abdomen. With the exception of the areas over the liver and the spleen the abdomen is normally tympanic; if dullness is discovered, it is significant of solid, airless material. This may be fluid, tissue, or fecal material.

Abnormal Abdominal Findings.—An increased thickness of the abdominal wall is due to either fat or edema. These can readily be distinguished by noting whether or not the surface pits on pressure. If the abdominal wall is thin and wrinkled, it may be due to a wasting disease or may be the result of a long-standing tension brought about by abdominal distention.

Rigid abdominal muscles if bilateral are significant of peritoneal inflammation, intra-abdominal hemorrhage, perforation of abdominal viscera, or some form of thoracic inflammation which renders diaphragmatic movement painful. If only the right rectus muscle is contracted, it is usually indicative of appendicitis.

General distention of the abdomen has four causes: first,

fat in the abdominal wall; second, fluid in the abdominal cavity; third, gas in the peritoneal cavity or in some abdominal organ; fourth, a large abdominal tumor.

If the condition is due to fat in the abdominal wall, it is observed that this heavy, thick wall can be gathered up in folds in the hand and the great thickness thereby demonstrated. It is also observed that when the patient lies in the recumbent posture the anterior wall of the abdomen flattens somewhat and the side walls bulge. This condition is usually associated with varying amounts of fat in other parts of the body, notably the buttocks and thighs.

If fluid is contained in the peritoneal cavity, it is found that when the patient assumes the recumbent posture the abdomen flattens anteriorly and bulges laterally. In this position normal tympanic sound is elicited upon percussion in the middle of the abdomen but dullness is demonstrated at the sides. This is because the air-containing intestine seeks the highest level while the free fluid seeks the lowest level. If the patient is turned on the side, it will be discovered that the upper side now shows tympanicity whereas it formerly showed dullness upon percussion. If only a small amount of fluid in the peritoneal cavity is suspected, the patient should be required to assume a knee-chest position; it will be found that dullness is in evidence on the anterior abdominal wall. An estimate as to the quantity of fluid can be obtained by having the patient in the recumbent posture and directing an assistant to place the ulnar surface of the hand and forearm parallel to the linea alba and press firmly downward. If the examiner then places one hand on the left side of the abdomen and percusses with the other hand on the opposite side, a distinct transmission of the percussion stroke is noted by the palpating hand if a large quantity of fluid is present. To determine whether the fluid contained lies in the peritoneal cavity or is limited by an organ such as the bladder, the ovary, or the uterus the patient should be directed to turn from side to side as stated above while percussion is made.

Gas in the stomach and intestine may be present in sufficient quantity to produce excessive abdominal distention. Such gas distention is always within the alimentary tract unless perforation has been made which permits its escape into the peritoneal cavity. If such perforation and escape is suspected, the patient should be directed to lie on the left side while percussion is made over the region where right hepatic dullness is normally found. In this position such dullness will have disappeared but will again be demonstrated when the patient assumes the recumbent posture. Large accumulations of gas in the stomach and intestine are found in some cases of hysteria and obstruction of the intestines.

Tumors of the abdomen, if of large size, result in general distention. Palpation reveals their size, shape, location, mobility, and character. In palpating for a tumor it should be observed whether the tumor is extra-abdominal or intra-abdominal. If extra-abdominal it can be readily grasped in one or both hands as a part of the abdominal wall, while if it is intra-abdominal it escapes when the abdominal wall is gathered into a fold. It should be determined whether the tumor is freely movable or fixed, the direction in which it moves, and whether or not it moves with respiration. If it moves with respiration, it is usually attached to some organ in close proximity to the diaphragm. The direction in which it moves freely determines, in large part, to what organ it is attached. The character of the tumor cannot be determined by palpation except in a very general way. Examination may distinguish between a cystic tumor and a solid tumor but cannot determine whether it is benign or malignant. It should be remembered that malignant tumors almost invariably terminate fatally within eighteen months and the duration for a period of several years excludes the malignant consideration. Immovable abdominal tumors are those of the pancreas and aneurysms of the aorta. The latter of course will be found to pulsate rythmically.

Examination of the Stomach.—Physical examination of the

stomach is chiefly for the purpose of determining its size and position although it is of additional value in demonstrating gastritis, ulcer, and cancer. Inspection, palpation, percussion, and auscultation are all employed, yet auscultation has little value.

If the stomach is dilated, distention may be present in any of the abdominal regions. This is because of the mobility of the organ. The usual appearance when the stomach is prolapsed is a flat or hollow appearance in the epigastric region, evident when the patient is recumbent and increased when the erect posture is assumed. When the position is thus changed, there is visible distention usually in the umbilical region.

Palpation reveals tenderness over the entire inflamed area when gastritis is present. Gastric ulcer reveals a definitely localized tenderness midway between the umbilicus and the ensiform cartilage. Tumor at the pylorus in elderly people is almost invariably cancer. It may be immobile or mobile, depending upon whether or not adhesions have formed.

Percussion is valuable chiefly in determining the size and location of the stomach. It is obvious that the typanic note detected in percussion over the stomach is impossible to distinguish from the tympanic note elicited over the abdominal regions. However, if the patient is required to drink several tumblers of water and if percussion is made immediately after the ingestion of each, the dullness which is discovered will designate the lower border of the stomach. By this method it can be determined whether the stomach occupies its normal position and has its normal size or whether it is prolapsed or dilated.

Auscultation is chiefly of value in detecting cardic stenosis and gastric stasis. By placing the stethoscope over the stomach, the examiner hears a distinct esophogeal bruit about seven or eight seconds after deglutition, and this sound is followed in about five seconds by the sound of the food entering the stomach. In esophageal stenosis these sounds are not detected. In gastric statis fermentation occurs in the stomach

and this is evidenced by distinct crackling or sizzling sounds.

Examination of the Intestines.—Percussion and auscultation have a very limited and uncertain value in examining the intestines. The chief value of percussion lies in determining whether an enlargement is the result of gaseous distention or fecal impaction. It is obvious that other enlargements are of a chronic character, and their duration should indicate their character. Palpation is of greatest value, and its chief purpose is to detect the existence of unusual masses, as a tumor in any part of the intestines. The mobility and size will lend some information as to its attachment. Fecal accumulations are characterized by their boggy resistance.

Tenderness over the intestines is present in all forms of inflammation, and in ulceration this tenderness is distinctly localized. Inflammation of the appendix is marked by tenderness over McBurney's point. Muscular rigidity of the abdomen is found in inflammations where tenderness is marked.

Examination of the Liver.—Inspection, auscultation, and percussion are used in liver examination. Of these percussion is most valuable. The purpose of liver examination is to determine position, size, shape, and character. Inspection will sometimes reveal the outline of the lower border of the liver and in case of enlargement may reveal protrusion of the lower ribs in the right hypochondraic region. The chief value of ausculation is to detect the grating sound heard when a gall bladder containing gall stones is palpated.

Percussion is employed chiefly to determine the outline of the liver. Here auscultatory percussion is most valuable. By placing the stethescope at the approximate center of the evidenced liver dullness and by percussion outward in all directions the examiner can accurately outline the borders.

The gall bladder when empty is not palpable, but if it is distended may be palpated under the lower margin in the gall bladder fissure. If it is filled with gall stones a somewhat grating character may be detected. The gall bladder is normally quite movable, but such mobility is decreased by adhesions.

Enlargement of the liver is indicative of hypertrophic cirrhosis, amyloid degeneration, abscess, cancer, gumma, fatty infiltration, or congestion. Care should be taken that consolidation at the base of the lung or the accumulation of fluid in the pleura is not mistaken for liver enlargement. Such confusion may be eliminated by taking into account the associated symptoms. Also care should be exercised to avoid confusing a large fecal mass in the transverse colon with hepatic enlargement. This distinction can usually be made by detecting a narrow margin of tympanicity between the colon and the liver. Tumors below the liver may cause confusion. Auscultatory percussion will determine whether they are attached to the liver or not.

Decrease in the size of the liver is characteristic of atrophic cirrhosis. Care should be taken, however, to see that intrusion of the lungs from above or of the tympanic intestine from below does not lead to a false conclusion.

Displacement of the liver toward the superior or inferior is the result of thoracic or abdominal abnormality. Thus hypertrophic emphysema will cause an inferior displacement. Large accumulations of fluid in the right pleura or in the pericardium have the same effect. On the other hand paralysis of the right diaphragm leads to a superior displacement. Abdominal tumors or the accumulation of large quantities of gas or fluid in the abdomen lead to a superior displacement of the liver.

Upon palpation the character of the exposed surface of the liver should be carefully noted. In cirrhosis, cancer, gumma, and amyloid degeneration the liver appears to be hard and dense. In gall bladder enlargement, abscess, or hydatid cyst the consistency is elastic and fluctuating. In fatty infiltration and amyloid degeneration the surface is smooth. In cirrhosis the surface is granular. In cancer nodules of varying size are evident often with a slight central depression. In syphilis the gummas are slightly elevated and smooth.

Examination of the Spleen.—Palpation is the most common

method employed in examining the spleen. This organ cannot be palpated if of normal size and in its normal location. If enlarged or displaced it is palpable. Palpation should be made just under the tenth costal cartilage with the free hand pressing forward in the tenth interspace at the ends of the tenth and eleventh ribs. The spleen is tilted downward and forward. If enlarged its anterior surface can then be palpated and its transverge ridge readily detected. Under respiration this ridge can be felt to move with the diaphragm under the palpating hand. Often a distinct notch can be felt in this anterior ridge. When the spleen can be palpated in its approximate normal location, a positive diagnosis of enlargement can be made except in cases of extreme emaciation. Acute enlargement is found in practically all febrile diseases. Chronic enlargement of the spleen occurs in leukemia and chronic malaria. In these conditions the spleen becomes extremely enlarged, sometimes filling almost the entire abdominal cavity. Distinction can be made between an enlarged spleen and a displaced kidney by noting the transverse ridge on the former and observing the mobility with respiration. A displaced kidney moves very slightly with respiration while an enlarged spleen moves over a wider field.

Examination of the Kidneys.—The only reliable method for examining the kidneys is palpation. The purpose of palpation is to determine the location and size of the kidney. It is most often the right kidney which is movable or floating. Distinction should here be made between these two terms. If a kidney can be displaced downward as far as the traverse umbilical line, it is said to be movable. If, however, it can be displaced to the lower abdominal areas or across the median line, it is said to be floating.

In making the palpation the patient should be in the recumbent posture with the shoulders and head raised, with the knees flexed to relax the abdominal muscles. The supporting hand should then be placed under the two lower ribs and the palpating hand at the anterior under the costal arch.

Pressure should then be made and unless the abdominal wall is too thick the lower edge of the kidney can be palpated if it is of normal size and in normal position. If it is movable or floating, however, it can be displaced downward and readily slips under the palpating hand. It is quite possible in many cases to distinctly feel the entire outline of the organ. Enlargement of the kidney is present in hydronephrosis, pyonephrosis, tumors, and chronic diffuse nephritis.

CHAPTER VI

DISEASES OF THE DIGESTIVE SYSTEM

Stomatitis

Definition.—Stomatitis is an inflammation of the mucous membrane lining the mouth. The more common forms are simple, ulcerative, follicular, thrush, and gangrenous.

Stomatitis is usually related to disturbances of the digestive tract, infection of the teeth or alveolar processes, or ingestion of highly irritating substances.

Adjustment.—Corrective adjustments in the cervical and middle dorsal area of the spine are productive of good results in most cases of stomatitis. In those cases which are toxic, lower dorsal adjustments should be included.

Simple Stomatitis is also called catarrhal. There is redness and swelling of the gums, cheeks, or lips. Mastication is impaired because of tenderness. The tongue is usually coated and sometimes swollen. Often in children there is fever, and their appetites are greatly impaired. The patient complains of bad taste in the mouth and usually has a foul breath. The duration of this form rarely exceeds ten days.

Ulcerative Stomatitis is usually unilateral and is characterized by linear-shaped ulcers on the gums, lips, or cheeks. The ulcer may be shallow or deep. When deep, the gum may be

badly necrosed and the necrotic process may involve the adjacent teeth. The superficial ulcers are covered with white exudate and are extremely painful.

Inspection will reveal the narrow oblong ulcers which are situated upon a swollen base and covered with white exudate. The lymph nodes in the cervical region are enlarged. The breath has a foul odor. The appetite is poor and digestive disturbances are usually present. Many cases have hyperchlorhydria. Many of these cases among men are users of chewing tobacco which tends to keep the mouth in a non-hygenic condition. Children having ulcerative stomatitis sometimes have cutaneous eruptions simulating that of measles. The ulcers usually are limited from one to three in number and appear on one side of the mouth only.

Aphthæ or **Follicular Stomatitis** is characterized by the development of small vesicles which rupture and form superficial ulcers two to four mm. in diameter. These eruptive lesions appear on both sides of the mouth. The ulcers are covered with white exudate and bleed when the exudate is removed. Soreness in the mouth and foul smelling breath are present in all cases. The usual duration is less than ten days. Proper oral hygiene is most important in these cases.

Thrush usually appears in malnourished children, particularly in those that are bottle fed. The eruption consists of a multitude of white spots which increase in number and coalesce. These white spots can be removed without leaving a bleeding surface but promptly form again. This condition is due to a parasitic fungus which finds favorable environment in the malnourished and debilitated infant. Restoration of normal nerve function builds body resistance and effects prompt relief. It is important to observe proper oral hygiene and proper cleansing of all utensils which contact the baby's food.

Gangrenous Stomatitis is a rare disease which usually develops after the existence of an acute infectious disease. Most

patients are left in a debilitated condition by the infectious disease. In adults the condition may be precipitated by injury, surgery, or infection.

The first evidence of gangrene is a highly offensive breath. Examination may disclose swelling, redness, or bleeding ulceration. The inflammatory reaction is shown in the skin covering the affected part. Obstruction of superficial vessels causes distention of veins and give a dark color to the involved area. Usually there are fever, thirst, prostration, and quickening of the pulse and respiration. The mortality rate is high, and recovery leaves deformities that require plastic surgery.

Glossitis

Definition.—Glossitis is an inflammation of the tongue.

Adjustment.—Cervical and middle dorsal adjustments are indicated in glossitis. Lower dorsal adjustments should be included where there is a toxic factor in the cause.

Pathology.—Glossitis may follow trauma, infectious diseases, or digestive disturbances. The tongue is swollen and hyperemic. Usually the surface of the tongue is coated; it may become fissured and ulcerate.

Symptoms.—Chewing, speaking, and swallowing are painful acts in glossitis; this causes imperfect pronunciation in speaking and a tendency to live upon liquid food. The cervical lymph nodes are enlarged. The surface of the tongue is dry and fissured. Frequently the tongue protrudes because of its great size.

Black Tongue is found in some adults. The discoloration is on the posterior part of the dorsal surface. It is composed of hypertrophied papillæ which have a hair-like appearance. It does not produce discomfort and in most cases disappears spontaneously.

Leucoplakia Buccalis is a keratosis involving the epithelial cells upon the inside of the lips and cheeks and sometimes on

the tongue. It is most common in middle-aged adults and predominates in men. The lesions are white in color and may be smooth or elevated. Young lesions are devoid of any subjective sensation and are perfectly smooth. Older lesions may become elevated and disquamate from time to time. A small percentage of the cases develop papillomas. Since this condition is induced by irritation of sharp teeth, pipe stem, tobacco, or hot foods, all irritations in the mouth should be removed. As a rule the lesions disappear when the irritation has been eliminated.

Xerostomia is a dryness of the mouth due to deficient salivary secretion. It is not uncommon as a symptom of dehydration from fever and such diseases as diabetes and interstitial nephritis. In some instances the duct to the salivary gland is occluded as in mumps. In other cases no pathology exists indicating the condition to be a secretory neurosis. In such cases excellent results may be obtained from proper adjustments of the cervical and upper dorsal spine. The facial, glossopharyngeal, and upper dorsal sympathetics may be involved.

Acute Pharyngitis

Definition.—Acute pharyngitis is an inflammation of the mucous membrane lining the pharynx. It may be catarrhal or specific in nature. When catarrhal in nature, it is usually associated with the common cold. When specific in nature, it is commonly called **sore throat** or **"strep throat"** depending upon the appearance and the presence of bacteria in the smear.

Adjustment.—Lower cervical, upper or middle dorsal, and lower dorsal should be adjusted for the purpose of normalizing nerve function and restoring tissue resistance to the pharyngeal membranes.

Pathology.—In catarrhal cases the mucous membrane of the entire pharynx is red, swollen, and covered in part with altered mucous. In infectious cases there are usually patches

Chronic pharyngitis = clergyman's sore throat.

of white exudate upon the tonsils, fauces, soft palate, and posterior pharyngeal wall.

Symptoms.—Acute pharyngitis is a common affection, often being identified as a **cold in the throat.** It may begin with feverishness and sensations of dryness and soreness upon swallowing. There is a constant desire to clear the throat. The cervical glands are enlarged and the neck is tender and somewhat stiff. The inflammation may spread to the fossa of Rosenmüller and involve the eustachian tube. This impairs hearing and repeated attacks may cause catarrhal deafness. The inflammation may spread downward to the larynx and trachea, resulting in dysphonia and a metallic cough.

Chronic pharyngitis usually dates from an acute attack which has been aggravated by dust, smoke, or excessive use of the voice. There is a constant sense of irritation in the throat. The patient may cough or clear his throat for the purpose of relieving loose mucous. In due time the inflamed tissue undergoes hypertrophy and finally atrophies. Many of these patients also have chronic laryngitis; hence the name **clergyman's sore throat.**

Retropharyngeal Abscess

Definition.—This is an accumulation of pus in the posterior wall of the pharynx situated in the submucous connective tissue.

Adjustment.—Adjustment should include lower cervical and lower dorsal as revealed by spinal examination.

Pathology.—This usually follows throat infection where one or more lymph nodes in the submucous tissue become abscessed. The pus from a cervical spondylitis may seep through the posterior pharyngeal wall reaching the submucous tissue. Here it may become circumscribed forming an abscess. The amount of pus varies with the size of the abscess sac.

Symptoms.—From the onset there are fever, difficulty in

swallowing, and usually changes in the voice. Breathing may be impaired. There is cough, which is usually suppressed. The neck may be stiff, and the cervical lymph nodes are enlarged. The fever is usually irregular. Inspection of the throat reveals redness and an oval swelling which is the protruding abscess. The abscess fluctuates under pressure, and when large it interferes with deglutition and respiration. Upon pointing, the abscess has a yellowish or white spot at the point of perforation. Prompt drainage is indicated in such cases.

Follicular Tonsillitis

Definition.—This is an acute infectious inflammation of the tonsils characterized by an exudate from their follicles.

Adjustment.—Adjustment should be given for the removal of nerve interference in the lower cervical, middle dorsal, and lower dorsal areas of the spine.

Pathology.—The tonsils are enlarged and red. As a rule both tonsils are involved. The follicles are filled with a white cheesy material that is readily visible. In the early stages fibrin is abundant, and an attempt to remove the white spots causes bleeding. In advanced cases the exudate becomes purulent; this destroys the fibrin and permits removal of the exudate without bleeding.

Symptoms.—The onset is sudden with chilliness and a rise in the body temperature. A fever of 102 degrees is average. In severe cases the temperature may attain 104 or 105 degrees. There is general aching, particularly headache and backache. Swallowing is painful, hence avoided. The urine is scant and highly colored, the bowels are costive, the tongue is coated, and the breath has a foul odor.

During the second or third day yellowish-white spots appear in the follicles. These spots enlarge and coalesce. The entire tonsil may be covered or the patch may be confined to its medial surface. Within a week the patches slough and re-

covery is prompt. During the attack the appetite is lacking, and the patient loses much weight. With the decline in temperature there is rapid recovery.

Follicular tonsillitis may simulate diphtheria. It is to be differentiated from diphtheria by a microscopic examination of a smear. Septic sore throat is also distinguished from catarrhal tonsillitis by microscopic examination of the smear.

Quinsy

Definition.—Quinsy is an acute suppurative inflammation of the connective tissue around the tonsil. Pus collects between the capsule of the tonsil and its muscular bed. The condition is also called **peritonsillitis** and **suppurative tonsillitis.**

Adjustment.—The adjustment should include lower cervical, middle dorsal, and lower dorsal areas in the spine.

Symptoms.—Quinsy begins with malaise, sore throat, headache, severe backache, and intense aching in the lower extremities. The appetite and elimination are disturbed. The patient is not as alert as usual. After one or two days the affected tonsil becomes greatly enlarged and deep red in color; its surface is smooth as though it were stretched. There is a thick sticky colorless exudate upon the surface of the tonsil and adjacent tissue; this causes the patient discomfort and is removed with great difficulty. The adjacent palate and nasopharyngeal wall may be thickened and hearing impaired. The uvula may be pushed toward one side. Speech is impaired. The cervical glands are swollen, and the neck is stiff. The pain is of a throbbing character and becomes more intense as the tonsil enlarges. Between the sixth and eighth day the abscess points, is yellowish in color and is usually situated in the upper part of the tonsil. When the abscess perforates, the patient expectorates bloody pus. He obtains prompt relief and the fever falls by crisis. After this recovery is rapid.

The proper adjustment given early often prevents the development of an abscess. The large swelling will recede in a

few hours. Such a prompt result only occurs when the proper adjustment is given prior to the third day.

Chronic Tonsillitis

Chronic tonsillitis is the result of repeated attacks of acute tonsillitis. There are hypertrophy of the lymphoid tissues and enlargement of the follicles. The follicles may contain plugs of caseous material. The surface of the tonsil is rough and may even be nodular. In severe cases the tonsil may be honeycombed. As a rule, pus may be expressed from the follicles if the tonsil is subjected to pressure. When the tonsil is in such an advanced state of decay, it may be looked upon as a source of contamination, as it certainly impairs health. Such a tonsil cannot be reconstructed, and surgical removal is justified.

Hypertrophy of the tonsil may occur without infection. In childhood the tonsil is not only relatively larger but is actually larger than in the adult. Non-inflammatory enlargement causes the surface of the tonsil to be smooth. There are no enlarged follicles, neither can ill-smelling pus be expressed from the organ. Acute inflammation may develop in an enlarged tonsil as well as in one of normal size. The condition should be handled as one of acute tonsillitis.

Adenoids

Definition.—Adenoids are a hypertrophy of the lymphoid tissues lying in the posterior pharyngeal wall. During childhood the adenoid is normally quite large. When inflamed, this lymphoid tissue increases in bulk and produces obstruction of the nasopharynx. Such enlargement of the adenoids may be related to recurrent colds and sore throats. There is a marked reduction in the size of the adenoids about the time of puberty.

Adjustment.—Adjustments are indicated in the cervical, upper dorsal, and lower dorsal regions of the spine. Adjustments which tend to build up body resistance and improve

elimination make colds and sore throats less frequent. As a result, enlargement of the adenoids is benefited.

Symptoms.—The first symptom to attract attention is mouth breathing when asleep. The child may be restless from a feeling of suffocation due to impairment of breathing. The voice develops a nasal tone and pronunciation becomes faulty. Head colds and sore throats recur at irregular intervals. Hearing becomes impaired from involvement of the eustachian tubes. In advanced cases the nostrils may become small, the bridge of the nose broad, and the lower jaw often protrudes. The child is often mentally dull and unable to concentrate. This may be a result of faulty hearing. Most cases having enlarged adenoids appear undernourished. The dental arches tend to become triangular, mouth breathing is persistent, and nasal discharge is common.

Esophagitis

Definition.—Esophagitis is an inflammation of the mucous membrane lining the esophagus, which may be caused by the ingestion of chemical irritants or infectious micro-organisms, or which may be part of an inflammatory process involving the alimentary tract. Repeated swallowing of irritating substances tends to cause the esophagitis to become chronic.

Adjustment.—Since esophagitis is so frequently associated with gastritis and hyperchlorhydria, the most important adjustment is in the middle dorsal area of the spine.

Pathology.—In simple esophagitis the mucous membrane is hyperemic and edematous. The follicles which are enlarged give off an exudate consisting of altered secretion and cells. In cases of infectious origin there may be ulcers. Upon healing the ulcers tend to leave obstructive scars, and these scars then become a cause for dilatation. Occasionally esophageal veins become dilated and are known as varices. Such varices may be latent until they rupture giving rise to sudden hemorrhage.

Symptoms.—Deep-seated substernal pain is an early symptom in esophagitis and is commonly referred to as heartburn when mild. The pain is increased upon swallowing. If the esophagitis is associated with pharyngitis, the posterior pharyngeal wall will show redness, edema, and exudate of mucous. If associated with gastritis, there is epigastric tenderness, gaseous distention, and vomiting. The presence of mucous in the vomitus is evidence of catarrhal inflammation. In severe cases solid foods should be avoided for several days. Patients should be quiet and at complete rest.

Dilatation of the Esophagus

Definition.—Dilatation of the esophagus is the stretching of the muscular walls which results from loss of tone in the muscular fibers. Dilatations are favored by partial obstructions and disease processes which destroy muscular tone.

Adjustment.—Adjustments should be given in the upper and middle dorsal regions of the spine wherever nerve irritation is discovered.

Symptoms.—The dilatation may be cylindrical or saccular. Saccular dilatation is also known as diverticulum. When the stretching of the esophageal wall is slight, no symptoms may arise. When it is sufficiently large to collect food, the patient experiences a sensation of lodging of food. This food may ferment and give rise to bad breath. It may be raised by eructation and be devoid of HCl. A common location for a diverticulum is at the junction of the esophagus and pharynx. Accumulated food at this point may produce a visible and palpable tumor above the clavicle. Pressure upon this enlargement will force the contents into the pharynx.

When the dilatation is cylindrical, it most commonly forms above an obstruction near the cardiac orifice. There is difficulty in swallowing and regurgitation of food at frequent intervals. X-ray with a barium meal makes detection easy.

Tumor of the Esophagus

Tumor of the esophagus is not common, but both benign and malignant tumors develop in the esophageal wall. The most common malignant tumor is carcinoma and is found in men more often than in women. Tumors may occur at any one of the three natural constrictions of the esophagus, but malignant tumors predominate near the cardiac orifice. Fibromas and papillomas are among the benign growths that occasionally develop in the esophageal wall.

Symptoms.—The early symptoms are those of mechanical obstruction. Swallowing is difficult and may be with or without pain. There are loss of appetite and digestive disturbances. The patient complains of great thirst and sips water or liquids almost incessantly. There are loss of weight and pallor of the skin, both of which may be a result of starvation. When the growth is malignant, however, the emaciation and pallor are spoken of as cachexia. Progressive loss of weight, pallor of the skin, gnawing pain, vomiting of blood, and occult blood in the stool are the principal evidences of malignancy. The X-ray with barium meal is of value in the detection of esophageal tumors.

Some patients have a motor neurosis which consists of esophageal spasm. It also produces difficulty in swallowing but is without pain, anemia, or hemorrhage. The spasm is intermittent and is more apt to prevail when the patient is under emotional strain. It responds readily to dorsal adjustments which increase the flow of sympathetic inhibitory impulses.

Acute Gastritis

Definition.—Acute gastritis is also called **acute gastric catarrh.** It is a nonspecific inflammation involving the mucous membrane of the stomach.

Adjustment.—Interference with the flow of impulses through the splanchnic nerves cause disordered metabolism

and impairs the functional integrity of the stomach as an organ. This creates the susceptibility to gastric catarrh. Exciting causes may be overeating or ingestion of poorly masticated or irritating foods. Impairment of metabolism also favors the development of gastritis in connection with infectious diseases. Quite often gastritis follows influenza or is a part of the gastrointestinal form of influenza.

Pathology.—Catarrhal gastritis is usually limited to a congestion with edema in the superficial coats of the stomach. Inflammation induced by corrosive agents associated with infection may involve all coats of the stomach wall. In such cases there may be superficial or deep ulcers which leave hypertrophic scars upon healing.

Symptoms.—After eating a hearty meal, the patient experiences headache, epigastric distress, and a feeling of fullness. Pain may be mild or severe. The upper abdomen becomes distended and is tympanic upon percussion. Generally there are belching, nausea, and vomiting. In severe cases there is fever, the height of which is commensurate with the toxic condition. The tongue is coated and the breath has a foul odor. Pulse and respiration are accelerated in proportion to temperature. The urine is usually scant and highly colored. There may be delirium or stupor. Vomiting always develops: the vomitus consists of undigested food and mucous. Drinking of water usually provokes vomiting, the stomach being extremely sensitive. These patients should be kept quiet and be permitted to retain ample fluids. Oftentimes ginger ale or carbonated water can be retained. The usual duration is about ten days.

Chronic Catarrhal Gastritis

Definition.—Chronic catarrhal gastritis is an inflammation of the stomach mucosa characterized by disturbed digestion, increased mucous formation, weakness in the stomach wall, and changes in the character of the gastric juice.

Adjustment.—The splanchnic area of the spine should be adjusted in all cases. This includes the lower dorsal area which is of special importance in toxic gastritis.

Pathology.—Chronic gastritis may be preceded by the acute type or by hyperchlorhydria, or the stomach lining may have been irritated by chemical or thermal irritants over a long period of time. Prolonged irritation produces congestion, edema, and hypertrophy of the mucous membrane. As a result of this hypertrophy, the stomach may be altered in its shape and contour. Past erosions may have healed leaving scars, which add to the deformity. The gastric glands may be destroyed by these changes.

Symptoms.—Most patients with chronic catarrhal gastritis have a long history of indigestion. At first the attacks of indigestion may be mild but variable. The patient has learned that the attacks follow certain dietary indiscretions; consequently, these patients learn to avoid certain foods which are blamed for the digestive disturbances. The majority of cases have poor appetite, slow digestion, marked thirst, bad taste in the mouth, and epigastric fullness causing distress after eating. Usually there are headache, vertigo, insomnia, and restlessness. Pyrosis becomes annoying, especially following regurgitation of fluid. Vomiting may or may not be present. The finding of mucous in the vomited material is essential for a symptomatic diagnosis of gastritis. The clinical course of chronic gastritis is variable. Most patients become careful in their selection of food and live with reasonable comfort. Patients who are indiscrete in their living habits have constant annoying symptoms and develop psychopathic tendencies.

Gastroptosis

Definition.—The term gastroptosis implies the stomach has descended from its normal potition. This may occur as the result of stretching of the abdominal wall or may be part of a splanchnoptosis in which many abdominal organs are in-

volved. In most cases, however, the stomach and other ptosed organs develop in this abnormal position. A stomach whose fundus lies in the left iliac fossa may function perfectly. A prolapsed stomach may become diseased just the same as those in normal position; but it is a mistake to attribute all gastric symptoms to the abnormal position.

Very often a prolapsed stomach is also dilated, and in such cases the increased capacity and weight of the stomach are a factor in causing it to be prolapsed.

Symptoms.—Among the common symptoms are eructation after eating, lack of appetite, headache, and mental depression. The patient complains of feeling full. Sometimes a change in posture will give relief to these symptoms. Supporting the lower abdomen with the hands or wearing an abdominal belt affords the patient much relief. A careful fluoroscopic study after a barium meal permits observation of the peristaltic waves, motility, and emptying time of the stomach. Regular adjustments and rest in a horizontal position after meals affords marked relief.

Peptic Ulcer

Definition.—The term peptic ulcer is applied to erosions occurring in the digestive tract but more particularly to those in the stomach and duodenum.

Adjustment.—The spinal cause of peptic ulcer lies in the splanchnic areas of the spine. Nerve interference consists of imbalance between the sympathetic and parasympathetic divisions of the vegetative nervous system. Involvement of trophic nerves impairs the integrity of the cells and permits their destruction. Many peptic ulcers are preceded by prolonged or repeated attacks of hyperchlorhydria. HC1 is corrosive and tends to damage subnormal tissues. Since the flow of HC1 is influenced by psychic factors, worry should be avoided.

Pathology.—Peptic ulcers are usually situated near the pyloric valve. They may be single or multiple and are usually

round in shape, varying in size from a pinhead to one inch or more in diameter. Some peptic ulcers remain superficial; these may heal leaving smooth scars. Other ulcers are deep and involve the muscular wall; they may perforate and produce peritonitis. Most ulcers permit the escape of blood; but unless it is in large amounts, it may not be detected by the naked eye. Large scars deform the pyloric structures and offer varying degrees of obstruction.

Symptoms.—Case histories reveal that patients with peptic ulcers complain of digestive disturbances over a long period of time; this indigestion occurs in attacks. Occasionally cases are encountered where the onset was sudden and the symptoms persistent. When the ulcer has been established, there is severe gastralgia after eating. The pain may begin immediately after eating or may follow an interval of several minutes to an hour: this is probably due to the difference in the location of the ulcer. It is thought that those ulcers lying in the lesser curvature and the duodenum produce pain after a longer lapse of time. Highly seasoned foods add to the distress; and coarse foods such as whole wheat bread and hulls from corn, peas, or beans give the patient much discomfort. A change in posture may relieve the pain. When the pain is most severe in the back at the level of the eighth or tenth dorsal vertebra, it is frequently relieved by lying in the prone position. When the pain is most intense near the ensiform cartilage, it may be relieved by lying in the dorsal position.

The area of acute tenderness is often very small, can be covered by the tip of the finger, and is usually in the middle line of the abdomen between the ensiform cartilage and the umbilicus. Less acute tenderness may be diffuse. Vomiting is not a persistent symptom in all cases but frequently occcurs when the pain is most intense and when hemorrhage occurs. Vomited blood is somewhat dark red in color and usually acid in reaction. The blood which is not vomited passes through the alimentary tract and gives a dark color to the stool. Small quantities of blood do not alter the color of the stool but may

be detected as occult blood. Blood which has been retained in the stomach prior to vomiting has a coffee-ground appearance.

The appetite may be normal or even increased. As a rule the patient restricts the intake of food because of past painful experiences. He also has learned that certain foods give less distress, and the tendency is to subsist upon such foods. The three cardinal symptoms are pain, hematemesis, and acute circumscribed tenderness in the epigastric area. Pain which is relieved by eating results from hyperchlorhydria. Pain of peptic ulcer becomes intensified from ten minutes to four hours after eating. Hematemsis may follow the swallowing of blood; nevertheless, in other cases it strongly suggests a peptic ulcer or a ruptured varicose vein in the stomach wall.

Peptic ulcer differs from chronic gastritis in that the course of peptic ulcer is more rapid; and there are hematemesis, localized tenderness, and usually hyperchlorhydria. Chronic gastritis rarely has hematemesis, often no vomiting nor localized tenderness in the epigastrium. Peptic ulcer differs from carcinoma of the stomach in that carcinoma has dull gnawing pain, emaciation, cachexia, and coffee-ground vomit. Carcinoma is more common in people after middle life, while peptic ulcer predominates in people between twenty and forty years of age.

Carcinoma of the Stomach

Definition.—Carcinoma of the stomach is a malignant growth composed of epithelial cells developing in the stomach wall.

Adjustment.—The Chiropractic profession does not claim that spinal adjustment is a specific cure for carcinoma. Nevertheless, carcinomas of the breast, stomach, liver, and intestine have disappeared under adjustments. The cases referred to were diagnosed after exploratory operation and biopsy; this would indicate that disordered nerve function is at least one important causative factor which the Chiropractor is able to remove. It is necessary that the Chiropractor carefully examine the spine and remove interferences where they are

found to exist, whether they be in the cervical, dorsal, or lumbar areas of the spine.

Pathology.—The most common types of carcinoma found in the stomach are scirrhus, medullary, and colloid. The scirrhus type has an abundant fibrous stroma; blood vessels and lymphatics lie in the stroma. The medullary type contains an abundance of cells which grow rapidly and degenerate early; its cellular substance is scant. The colloid variety is most commonly an adenocarcinoma; it is relatively rare and undergoes colloid degenerative changes.

Carcinomas are derived from ectodermal and entodermal structures; and as compared with other growths, they grow rapidly. These growths are not encapsulated, and spread is by metastasis. There is a tendency to undergo secondary changes early and to recur after removal. Carcinoma of the stomach is most common in middle life or thereafter. Most carcinomas of the stomach are primary. They are most common in the pylorus or at the cardiac orifice and less common in the lesser curvature. The anterior and posterior walls and the greater curvature are affected infrequently. Cancerous emboli may enter the portal circulation and be conveyed to the liver causing the liver to be the most common location of secondary carcinoma.

Symptoms.—During the early stages when the growth is small and there is no ulceration, the symptoms are latent. As the growth develops, digestive disturbances arise; but most patients attribute these disturbances to dietary indiscretion. Among the early symptoms are loss of appetite, sensations of fullness and discomfort after eating, and occasional belching. In due time there are loss of weight and pallor of the skin indicative of anemia. There may be intermittent vomiting, which is not significant until it contains traces of dark blood. Coffee-ground vomit is an indication of ulceration which permits the escape of blood in small quantities that is not vomited until acted upon by the digestive juices. Occult blood may be found in the stool prior to the advent of tarry stools or coffee-

ground vomit. In advanced cases vomiting may become marked after eating. The patient becomes greatly emaciated and has a sallow color. All muscles become thin and weak, and the appetite has completely disappeared. Pain is a symptom subject to much variation: In the early stages it may be dull; with ulceration it may be severe; some cases have pain of some degree continuously; others have attacks of gastralgia that are most intense and recur at intervals. The gastric juice has diminished HC1; this may develop relatively early and cause slow emptying of the stomach, much indigestion, and intermittent vomiting. When HC1 disappears, it may be replaced by lactic acid which forms when there is gastrectasis and absence of HC1.

The tumor may be palpable through the abdominal wall and varies greatly in size and firmness. It may be freely movable or may be fixed by adhesions. Smaller growths, particularly those in the cardia and pylorus, are not palpable. X-ray studies with barium meal are of great value in determining location and size.

The cardial symptoms are progressive emaciation and debility, loss of appetite, gnawing pain, coffee-ground vomit, palpable tumor in the region of the stomach, and cancerous cachexia. When secondary carcinomas develop in the liver, that organ becomes enlarged and is palpable below the costal margin. The area of the hepatic dullness is increased. There may be tenderness in the vicinity of the gallbladder, and there often is pain radiating toward the angle of the right scapula. Obstructive jaundice exists in most cases.

Stenosis of the Pylorus

Definition.—Pyloric stenosis is a narrowing or obstruction of the pyloric orifice by changes in the surrounding wall. The stenosis may be functional or organic.

Adjustment.—Functional stenosis is usually called **pylorospasm.** It is most readily corrected by upper cervical adjustments which increase the flow of nerve energy through the

vagus nerve. Organic stenosis, if correctable by spinal adjustments, yields to correction of the middle dorsal area of the spine.

Pathology.—Pylorospasm is a contraction of the circular fibers due to sympathetic stimulation. It may be reflex in its cause, however, and occur in connection with ulcers of the stomach, passage of a calculus through the bile duct or ureter, or peritonitis, which is so often associated with appendicitis, ovaritis, and cholecysitis. Organic causes of stenosis of the pylorus may be carcinoma, scars from peptic ulcers, benign tumors, and pyloric hypertrophy. In the latter case there is often much thickening of the mucous membranes and connective tissues due to the hypertrophy.

Symptoms.—When food is unable to pass into the duodenum, fermentation begins. This causes epigastric fullness and discomfort. The appetite fails and vomiting relieves the distress. It is not uncommon for patients to eject ingested food shortly after a meal. In due time, however, the tonus of the stomach wall is impaired; this induces dilatation of the stomach with its periodic vomiting.

Dilatation of the Stomach

Definition.—Dilatation of the stomach is also known as gastrectasis and is a condition in which the stomach wall becomes stretched and loses the ability to mix food with gastric secretions or expel the stomach contents into the intestine.

Adjustment.—The adjustment may be upper cervical or middle dorsal, depending upon the type and cause of the dilatation.

Pathology.—Dilatation of the stomach may be atonic or obstructive. In the former the nerve interference impairs the flow and expression of motor function in the muscle fibers. As a consequence, the muscle becomes atonic.

In the obstructive form there is usually a growth, a scar, hypertrophy, or adhesions which offer resistance to the exit

of food from the stomach. The weight of the gastric contents and the abnormal chemical process which arise in the stomach lead to the weakening and stretching of the stomach wall.

Symptoms.—From the beginning there is a feeling of fullness and distress in the epigastric region. At intervals there are eructations of gas and fluid. The appetite is usually good but may be satisfied after ingestion of very little food. Constipation is persistent in most cases, and the upper abdomen is distended and tender. The patient loses weight and strength. Thirst increases with the obstruction; it is, no doubt, adaptive and assists in washing small particles of food through the partially obstructed opening. Periodic vomiting develops in most cases. During each attack large quantities of partially digested food are expelled. Upon standing, this vomitus separates into layers: the upper layer consists of a froth; the middle layer consists of fluid—the gastric juice and ingested liquids; and the bottom layer consists of more solid undigested food. The vomitus is usually acid in reaction and has a foul odor. X-ray studies of the stomach will reveal the degree of dilatation and the diminished peristaltic activity. X-ray is also of value in determining the rate of emptying. It is not uncommon for food to remain in the stomach for several days.

Neuroses of the Stomach

The neuroses of the stomach are motor, secretory, or sensory disturbances which impair the digestive process. They are sometimes referred to as the **dyspepsias.** A true neurosis is a functional disturbance without any anatomical change. The primary cause of gastric neuroses is interference with the transmission of nerve energy through either the vagus or the sympathetic dorsal nerves. Contributing factors are faulty eating habits, emotional strain, and disturbances elsewhere in the body which tend to evoke gastric reflexes.

The term **nervous dyspepsia** is a generic term applicable to any functional defect. It may be a mixed neurosis involving motor and secretory or motor and sensory disturbances. The

more common neuroses are hyperchlorhydria, hypochlorhydia, pyloral spasm, hypersecretion, gastralgia, anorexia, hypomotility, and regurgitation which is commonly called waterbrash.

Hyperchlorhydria

Definition.—Hyperchlorhydria is a secretory neurosis of the stomach in which there is excess HC1 in the gastric juice. It is often associated with hypersecretion.

Adjustment.—Vagal impulses activate the secretory cells of the stomach. Hyperchlorhydria and hypersecretion occur when there is imbalance between the vagal and sympathetic control of this organ, the vagus being predominant. Middle dorsal adjustments restore neurological balance in the vegetative nervous system. Upper cervical adjustments which would tend to increase activity of the vagus are contraindicated.

Symptoms.—When the acidity of the gastric juice is excessive, the patient may have rapid digestion, a good appetite, and no discomfort. When the HC1 is further increased, it causes burning pain in the epigastrium. There may be a sensation of weight or pressure and occasionally regurgitation of bitter fluid. Pyrosis is common. Some patients have vertical headaches. During the early stages abdominal discomfort is relieved by the ingestion of food, particularly protein food. Absolute rest and mental freedom also afford great relief, while exertion, fear, worry, or other emotional strain aggravate the condition.

Hypochlorhydria

Definition.—Hypochlorhydria is a secretory neurosis in which there is a deficiency of HC1 in the gastric juice. When the HC1 disappears entirely, the condition is known as **achlorhydria or achylia.**

Adjustment.—Specific adjustments in the upper cervical region or correction of the condyles is indicated. Middorsal adjustments are contraindicated because increased activity of

the middle dorsal sympathetics would further inhibit the flow of acid.

Symptoms.—This condition frequently follows prolonged mental strain or worry and may be spoken of as a depressive neurosis of the stomach. Anorexia is a constant symptom. The patient has a feeling of epigastric fullness, sometimes pain, and occasionally nausea. Distention of the abdomen and eruptions of gas are almost constant. Most patients say they feel best when they do not eat. A mouthful of water often induces discomfort and belching. When this condition is associated with pyloral spasm, vomiting occurs shortly after eating. The gastric contents are low in acid and in a state of fermentation.

Gastralgia

Definition.—Gastralgia is a sensory neurosis of the stomach characterized by periodic attacks of intense pain.

Adjustment.—This is caused by nerve root pressure or tension in the splanchnic area between the fifth and ninth dorsal vertebrae.

Symptoms.—Gastralgia may be a symptom of an organic disease and as such is not considered a neurosis. When it is a pure neurosis, the onset is sudden with nausea, epigastric fullness, faintness, and vertigo. The pain is most severe and agonizing. It is centered midway between the ensiform cartilage and umbilicus. Tenderness is traceable from this area to the middorsal spine. During an attack of gastralgia the face and extremities are pale, cool, and moist; the facial expression is anxious. The attack may last for a few minutes or for an hour or two. Physical exertion, overeating, or the ingestion of ice cold drinks often induce attacks of gastralgia.

Splanchnoptosis

Definition.—Splanchnoptosis is the prolapse of the abdominal viscera. Ptosis of a single organ is comparatively rare and is always related to other impairments of health. Usually

the abdominal wall is atonic as a result of repeated pregnancies, ascites, or obesity. As a rule, the prolapsed organ is enlarged and of increased weight. Accompanying ill health diminishes the tone of all supporting tissues, favoring a general prolapsis.

Adjustment.—Adjustments are indicated in the dorsal and lumbar areas according to the structures which are atonic. More important, however, adjustments are needed to correct associated conditions which have caused an atonic state of the muscular system.

Symptoms.—Prolapses of the abdominal organs are frequently congenital rather than acquired, the former being more common in those individuals of asthenic constitution. Most of these cases are entirely free of symptoms: their organs function well, and they are not cognizant of the prolapses until advised by an examiner. Too often functional disturbances in the digestive tract are attributed to prolapses when the prolapses are congenital. However, adjustments may correct the functional disturbances without altering the position of the organ. The fishhook type stomach is frequently seen in the left iliac fossa, and the V-shaped transverse colon may extend into the hypogastric region in patients whose digestive and bowel action are perfectly normal.

Patients complain of bachache, sensation of abdominal weight, or pressure in the lower part of the abdomen. Many of these cases have poor appetites, digestive fermentation, and abdominal distention. Frequently the patients are weak and tire easily, yet they are not emaciated. Pressure upon the urinary bladder may cause vesical irritability and frequent voiding of urine. Pressure upon the colon produces obstructive constipation. Prolapse of the kidney causes considerable pain in the back or side. This pain may be relieved by pressing upward and toward the median line of the body with the hand. Prolapses of the spleen or liver alter the area of visceral dullness on percussion; and since these organs are firm, they are easily palpable.

Visceroptosis is a common cause of bad posture. A pendulous abdomen causes a deepening of the lumbar curve. The shoulders may be carried toward the posterior, but the head is inclined forward. Corrective exercises and careful attention to the posture are beneficial, even in strengthening the abdominal wall. An abdominal support is often of value provided the organs are not enlarged or beseiged by a series of disease processes.

Acute Catarrhal Enteritis

Definition.—Acute catarrhal enteritis is a nonspecific inflammation of the mucous membrane lining the intestines. It is characterized by fever, pain, tenderness, and diarrhea.

Adjustment.—Middle and lower dorsal and upper lumbar adjustments are indicated in all cases.

Pathology.—The mucous membrane affected becomes congested and swollen. The mucous follicles discharge an exudate of altered mucous. Occasionally ulcers develop and become chronic. The digestive secretions are altered, and peristaltic activity is retarded.

Symptoms.—Catarrhal enteritis may date from dietary indiscretion or an attack of an infectious disease, such as influenza. When situated in the duodenum it is usually associated with catarrhal gastritis and may spread to the common bile duct inducing jaundice. When it involves a larger area of the small intestine, there are fever of 101 or more, abdominal pain, loss of appetite, and moderate diarrhea. The face is flushed, and the skin of the body feels warm and dry. The pulse and respiration are increased in ratio of the fever. The character of the stool changes shortly after the onset: in the early stages there may be considerable fecal matter; a few days after the onset the stool is composed largely of mucous, watery fluid, and undigested food. Frequent bowel movements cause the patient to be dehydrated, which accounts for the extreme thirst. When ulcers form in the intestines, traces of deoxygenated blood may be found in the stool.

When the colon is involved, the condition is commonly called **colitis.** The volume of mucous in the stool is very great. There is a greater tendency toward the development of ulcers. Many cases of colitis date from an attack of dysentery, and the condition is actually one of chronic dysentery. Most patients having chronic colitis have a previous history of constipation. The colon may be dilated at points and is distinctly spastic at other points.

Diverticula are common in the ascending colon. A diverticulum of the colon is detected by X-ray with a barium meal or enema. The stretched wall fails to empty the diverticulum and permits retention of the barium for days.

Inflammation of the lining of the rectum is known as **proctitis.** It is characterized by the passage of large quantities of mucous and by persistent tenesmus.

Chronic catarrhal enteritis is a continuation of the acute form. It is said to be acute during the first three months of its existence, subacute between the third and twelfth month, and chronic thereafter. The case history indicates that the patient's aliment started with the symptoms of acute enteritis which gradually and partially subsided. The bowel is irritable, and intermittent attacks of severe diarrhea are common. Mucous in the stool is a predominate symptom. In minor cases the mucous may be in small quantities, but in severe cases large patches of extensive pseudomembranes may form and be discharged. No diagnosis of chronic catarrhal enteritis nor of catarrhal colitis is justifiable unless mucous is present in the stool.

Digestion and assimilation are always impaired, hence the patient loses weight and strength or even becomes anemic. Many patients become melancholic and lose interest in life. Such cases usually fear the development of a serious condition, especially malignancy.

Both acute and chronic cases of enteritis including colitis should be careful in the selection of their food. It is advisable to subsist on smooth foods, avoiding those having fibers or

hulls that will produce mechanical irritation. These patients can secure the benefit of coarse fruits and vegetables by using their juices.

Mucous Colic

Definition.—Mucous colic is a form of chronic colitis characterized by periodic attacks of pain and the discharge of large quantities of mucous. Mucous colic is also known as **membranous colitis** and **mucous diarrhea.** It was formerly classified as a secretary neurosis of the intestines. It is most common among individuals of nervous temperament and predominates in the female sex.

Adjustment.—Upper cervical, lower dorsal, and lumbar adjustments are indicated. The upper cervical is of particular importance in the neurotic cases.

Symptoms.—Mucous colic is chronic in its course, yet each attack is acute in itself. It begins with gastric and intestinal discomfort. This is followed by severe abdominal pain occurring in paroxysms. After several hours a large quantity of mucous is discharged, giving relief. During the attack of pain the patient has an anxious facial expression, rapid respiration, and clammy skin; there are usually emotional disturbances.

The intestinal mucous may be discharged as a large mass of transparent or white-colored mucous. Sometimes it is stringy and ribbon-shaped, at other times cylindrical. When placed in water, the cast of the intestine may be unraveled by picking the mucous apart with needles. Between attacks the patient may have minor digestive disturbances. Regular adjustments and strict observation of diet lead to favorable results.

Infantile Diarrhea

Frequent fluid evacuations of the bowels are associated with many diseases. In children intestinal irritation may be caused by the mechanical irritation of sand or foreign bodies swallowed by young children. Older children compelled to live on

improper food may develop intestinal fermentation with a resulting mild diarrhea. During hot weather children may ingest food in a state of fermentation or be exposed to sudden atmospheric changes which are followed by acute diarrhea. There are colicky abdominal pains, abdominal distention, and mild fever. The stools are frothy and liquid; they number a dozen or more per day. The condition yields readily to proper adjustments and change in environment.

Enterocolitis is an acute inflammation of the lower part of the small intestine and of the upper part of the large intestine. It is believed to be of infectious origin and is marked by the development of ulcers.

Small perforating ulcers, pinhead in size, develop in the intestinal mucous membrane. Beneath the mucous membrane the ulcers spread destroying the submucous areolar tissue. This loosening of the mucous membrane causes it to become telescoped and obstruct the intestine. These cases begin with moderate diarrhea consisting of feces and small amounts of mucous. Later blood appears. The fever varies from 102 to 104 degrees. The abdomen is distinctly tympanitic and tender. The stools vary from ten to forty per day. The child loses weight, becomes pale, and is inattentive to his surroundings. Blood and shreds of membrane finally appear in the stool. Symptoms of shock denote intestinal hemorrhage which may prove fatal.

Cholera infantum is an acute inflammation of the mucous membrane of the stomach and intestines characterized by pain, vomiting, purging, and prostration. Adjustments are in the middle dorsal, lower dorsal, and lumbar regions.

Symptoms.—The condition is less common than a few years ago. The onset is sudden with chilliness and a rapid rise in the body temperature to 103 to 105 degrees. Vomiting occurs early and is accompanied by abdominal pain and severe purging. After the food residue has been removed from the alimentary tract, the vomitus and the stool resemble each other, both being serous in character. The stools number from ten

to thirty per day. Between the third and the fifth day the condition changes for better or worse. In favorable cases the temperature is reduced, vomiting and purging diminish. Unfavorable cases are marked by an increase in the temperature to 106 degrees or over. The eyes become sunken and partially closed; the pupils are contracted. The mouth remains open. The lips are cracked and bleeding. The skin may become cool and moist with thready pulse and imperceptible respiration. Although the disease may be fatal in a few hours, more often it extends over a period of a week.

Diphtheritic Enteritis

Definition.—Diphtheritic enteritis is an acute infectious inflammation of the intestines characterized by the formation of a pseudomembrane.

Adjustment.—Lower dorsal and lumbar.

Pathology.—Diphtheria of the intestine is rare, but when present the intestinal mucosa develops a pseudomembrane which is composed of the exudative products discharged by the mucous follicles. Such a pseudomembrane tends to obstruct the intestine and also recurs after removal. After a week's duration, the false membrane sloughs and is discharged.

Symptoms.—Diphtheritic enteritis occurs as a complication of pharyngeal diphtheria. There are fever, abdominal distention, and pain. The abdomen is tender upon palpation. Shreds of pseudomembrane and blood may be discharged with the stool. Aside from these the symptoms are those of intestinal obstruction, the nature of which must be judged from the case history.

Dilatation of the Colon

Definition.—Dilatation of the colon is a stretching of the intestinal wall due to motor paralysis, obstruction, or congenital deformity.

Hirschsprungs disease or Megacolon = a disease in which the colon may hold as much as 2-3 gallons of liquid, Congenital (rare disease but very serious)

Adjustment.—Adjustments of the lower dorsal and upper lumbar region are indicated.

Symptoms.—The colon wall may be temporarily distended by gas which results from intestinal fermentation. Obstructive dilatation results from growths or acute intestinal obstruction. An atonic dilatation may be a result of prolonged constipation which has resulted in toxemia that in turn has acted upon the intestinal musculature. Constipation may become obstructive, thus causing the atonic and obstructive dilatation to be related. The principle symptoms are obstinate constipation, abdominal distention, anorexia, pallor of the skin, and bad breath. The dilatations are not palpable and cannot be detected except by X-ray with barium in the colon. The location, size, and shape of the dilatations are readily outlined by this method.

Enteralgia

Definition.—Enteralgia is an acute paroxysmal pain centered in the lower part of the abdomen and is characterized by abdominal contraction and fear.

Adjustment.—Local adjustments in the lumbar region usually correct this condition. + upper dorsal

Symptoms.—Enteralgia is an intestinal neurosis. It occurs in attacks which appear to be precipitated by ice drinks, large quantities of food, or violent exercise. The attack is sudden in its onset with intense pain situated in the umbilical area. Rigid abdominal muscles, short and jerky resiprations, an anxious facial expression, and clinched features are revealed by inspection. The skin may be cool and moist. The attack may end with nausea and vomiting. The duration of an attack varies from a few minutes to two or more hours. A point of diagnostic value is that the intense pain will be decidedly relieved if firm pressure with the palm of the hand be applied to the abdominal wall in the region of the umbilicus. Enteralgia is to the intestines what gastralgia is to the stomach.

Appendicitis

Definition.—Appendicitis is an acute inflammation of the vermiform appendix which involves the surrounding peritoneum and is characterized by fever, pain, and localized tenderness at McBurney's point.

Adjustment.—The primary cause of appendicitis is interference with the innervation of the appendix due to vertebral misalignment in the lower dorsal or upper lumbar area of the spine. An enervated appendix may become hypersensitive and susceptible to injury by mechanical, chemical, or bacteriological agents. The cecum is relatively atonic as compared with other portions of the large intestine; hence in obstinate constipation the cecum becomes distended and impacted. This in itself causes irritation or a mild degree of injury, and inflammation is the reaction of tissue to injury. When the narrow lumen of the appendix becomes congested and edematous, the appendix encounters difficulty in discharging its secretion into the cecum. The retained secretion together with exudate becomes a susceptible field for infection. This would tend to superimpose a new inflammation upon the one already existing. In mild cases the inflammation may be nonsuppurative, but in severe forms suppuration and even gangrene may occur. The inflammation spreads by peripheral extension to the cecum and peritoneum and also is disseminated through the lymphatic channels. Among other mechanical agents that cause irritation may be foreign objects, which were swallowed, and enteroliths. The enterolith may be composed of fecal matter, epithelial cells, mucous, or calcareous matter.

Pathology.—In simple or catarrhal appendicitis there is no infection. The blood vessels of the appendix are distended, and the surrounding tissue is edematous and infiltrated with cells that escaped from the engorged vessels. The lumen of the appendix is obstructed with exudative products. The secretion of the appendix is increased, thus transforming the organ into a retention cyst.

Acute diffuse appendicitis is often suppurative and sometimes gangrenous. Pathogenic bacteria are invariably present. The appendix is congested and edematous; its contents are purulent. Ulcers frequently form upon the mucous membrane, and thrombosis of appendiceal vessels is not uncommon.

Nerve Tracing.—Tenderness is marked over McBurney's point. From this site the course of the tender cutaneous nerve may be followed to the upper lumbar spine. This is of value in determining the intervertebral foramen at which nerve interference occurs.

Symptoms.—The first symptom of appendicitis is pain. At first the pain may be diffuse or in the left side or epigastrium. Within a few hours it becomes localized in the lower right quadrant of the abdomen. The pain grows in intensity and is excruciating upon deep inhalation, coughing, or movement. The patient assumes the dorsal rigid posture in which there is rigidity of the abdominal muscles and flexion of the thighs upon the abdomen. This position limits respiratory movement and affords the patient slight relief.

Examination of the patient discloses marked tenderness at McBurney's point with diffuse tenderness over the lower right quadrant of the abdomen. Muscular rigidity which is readily palpable is a motor reflex induced by the pain. The chief cause of the pain inducing this rigidity is friction and stretching of the peritoneum adjacent to the appendix.

The vast majority of cases have fever from the onset. The temperature may rise with or without a chill and varies from 101 to 104 degrees. The bowels are costive, and the urine is scant and highly colored. The principle finding upon urine examination is indicanuria which is abundant in the presence of suppuration. There are thirst, anorexia, nausea, and vomiting in the majority of cases.

The enlarged appendix is rarely palpable because of the abdominal rigidity and extreme tenderness. Occasionally,

however, it may be palpable through the abdominal wall as an egg-size enlargement. Abdominal examination causes an accentuation of the hippocratic countenance; this is a facial expression of anxiety. The upper lip is elevated uncovering the upper teeth. In breathing the patient usually has an expiratory "grunt."

In mild cases the leukocyte count may be but slightly elevated; however, in the presence of suppuration the white cells usually exceed twenty thousand. Many regard the leukocytosis in excess of 24,000 as an indication for immediate surgery.

Absorption of pus into the blood stream causes a change in the type of fever. It becomes irregular with attacks of chill, fever, and sweat; this is known as the suppurative type of fever.

Adjustments should be administered from one to three times per day during the acute stage. Improvement is usually effected in on eor two days. The patient should be kept quiet and given ample liquids. A rectal enema is of value, but purgatives and high enemas are definitely contraindicated.

Differential Symptoms.—Right renal colic differs from appendicitis in that the pain starts in the right lumbar region and radiates obliquely toward the bladder. Pain is sharp and continuous. There is usually vesical irritability and often hematuria. The pain of renal colic is not increased by bodily movements, nor is the patient cautious against movement or examination of the abdomen. In hepatic colic the pain begins in the epigastrium and radiates into the right shoulder along the course of the eleventh to fifteenth spinal nerves. The muscular rigidity affects the upper right quadrant of the abdomen. Usually there is jaundice; the stools are clay colored; and the urine contains bile pigment. In both renal and hepatic colic there are little or no fever, no localized tenderness at McBurney's point, and no tenderness traceable to the upper lumbar vertebræ on the right side.

Intestinal Obstruction

Definition.—Intestinal obstruction is applied to any condition in which the lumen of the intestine is partially or completely occluded.

Adjustment.—Adjustments must be made locally according to the innervation of the part of the bowel obstructed. Many cases of intestinal obstruction require other attention than spinal adjustment; hence thorough investigation of both the spine and the effect in the intestine are necessary.

Pathology.—The most common causes of intestinal obstruction are strangulation, volvulus, intussusception, intestinal impaction, and growths.

Strangulation may result from contraction of the circular muscle fibers of the intestinal wall, or the bowel may become strangulated by adhesions caused by previous inflammatory processes. Volvulus is usually a twisting of the intestine which occludes its lumen. This may be caused by improper development of the mesentery, or it may follow severe falls or other injury. It is most common among males during middle life. Intussusception is a telescoping of one part of an intestine into the part next below. It occurs most frequently in infants or young children, and frequently the telescoping occurs at the ileocecal valve.

Obstruction by the intestinal contents may be brought about by gallstones, worms, impacted feces, or enteroliths. In addition, there may be foreign substances, such as those commonly swallowed by young children.

The term growths is applied principally to tumors but should include lesions of tuberculosis and syphilis. Growths frequently develop in abdominal structures other than the intestines and produce their obstructive effect by pressure. In some instances, however, the growth may form in the intestinal wall.

Symptoms.—Intestinal obstruction begins with abdominal

pain situated at or near the site of the obstruction. At first the pain is intermittent, probably due to the intermittent peristaltic waves encountering resistance. The pain increases in intensity and ultimately becomes continuous. There are moderate hypertension of the abdominal wall and tenderness over the obstruction. This tenderness is invariably traceable to the spine. Within a few days after the onset vomiting becomes on outstanding symptom. At first the contents of the stomach are emptied; later the act of vomiting continues with the expulsion of small amounts of gastric juice. If vomiting is continued, bile is raised, and finally the intestinal contents having a fecal odor are cast up. This latter symptom is regarded as being pathognomonic of intestinal obstruction.

The abdominal wall is distended; percussion shows it to be tympanic. The tympanites is very marked when the obstruction is in the colon but would be very slight if in the small intestine. Abdominal tumors if present are usually palpable. When intussusception is present, a sausage-shaped tumor may be palpable. There are great prostration, anxious facial expression, rapid small pulse, and rapid shallow respiration. Death may result from intestinal obstruction itself and is preceded by the symptoms of colitis. There is also danger of gangrene. In several forms of acute intestinal obstruction vessels may become constricted causing asphyxiation of tissue. This condition may develop in from three to six days from the onset.

When the obstruction is partial, there is marked infrequency of defecation. The stools may be small in size and ribbon-shaped if the obstruction is in the rectum. The abdomen is distended and tympanic. There is considerable abdominal discomfort, sometimes pain. The patient complains of occipital headaches and poor appetite. There are emaciation and pallor of the skin due to anemia. A fecal odor emanates from the skin and is easily detected from the breath; this is evidence of absorption from the obstructed and distended intestine.

Carcinoma of the Intestine

Definition.—Carcinoma is a malignant growth derived from the epithelial tissues and destroying the organ in which it develops.

More than one-half of all malignant growths occurring in the intestinal tract are situated in the rectum. They also develop in the sigmoid flexure, cecum, transverse colon, splenic flexure, ascending colon, and hepatic flexure in this order of frequency. Intestinal carcinomas are most common after 60, but they occur under 40 and occasionally in infants.

Adjustment.—Refer to carcinoma of the stomach.

Pathology.—In rare instances sarcoma develops from the connective tissue within the abdominal wall. A sarcoma does not tend to obstruct the intestine except by pressure upon it.

Carcinomas of the duodenum are identical with those which develop in the stomach. Most intestinal carcinomas are adenocarcinomas and include fibrocarcinoma, gelatinous adenocarcinoma, melanoma, and squamouscell carcinoma. Since they are not encapsulated, they spread by metastasis. The secondary changes form toxins which upon absorption impair nutrition; loss of weight and cachexia result.

Symptoms.—In the first stages carcinoma may have no symptoms whatsoever. The earliest changes are loss of weight, anemia which is secondary, and cachexia which results from the toxic state. Pain may not develop until the intestine is obstructed by the growth, at which time there would also be obstinate constipation. Prior to this stage the bowels are inactive, and diarrhea frequently alternates with constipation. Large growths are quite readily palpable through the abdominal wall; this is particularly true of sarcomas which may be massive. In many cases there is slight fever which appears in the late afternoon or evening. Growths situated in the upper part of the small intestine cause early vomiting, and the patient will usually say that he feels best

when his stomach is empty. Growths situated in the large intestine have marked tympanites, alternating constipation and diarrhea, sensations of weight and pressure preceding pain. Occult blood is usually found in the stool upon microscopic examination. Sometimes the stool contains pus and blood visible to the naked eye. X-ray examination of the intestinal tract with the proper barium meal or enema usually reveals informative facts as regards location and size of the growth. The duration of intestinal carcinoma varies with the degree of malignancy, some cases being very chronic; the average case lasts from one to two years.

Worms

I. Tapeworm or Cestodes—There are two types of tapeworms which affect the human body. They are the Tænia saginata or beef tapeworm and the Tænia solium or the pork tapeworm. The beef tapeworm is most commonly encountered in the United States. It varies from ten to twenty-five feet in length and consists of several hundred segments. It has an oval-shaped head about one-tenth inch in diameter provided with four strong suckers. There are no hooklets on the head of this worm, hence it is sometimes called the "unarmed tape worm."

The pork tapeworm is also called the "armed tapeworm." It receives this name because its head is provided with a double circle of hooklets. The head of this worm is about one-fortieth inch in diameter and is provided with two or four suckers. This worm gains entrance to the body from the embryo contained in pork when insufficiently cooked before ingestion. This worm seldom exceeds twelve feet in length.

Both of these worms are parasites, not scavengers. They do not live on undigested food. Their head is firmly attached by their suckers and hooklets in the upper one-third of the small intestine. They live on the blood drawn by their suckers from the vessels of the intestinal mucosa. The lower segments represent matured parasites and are termed the proglottides.

Beef worms - not common in U.S.

For treatment of worms in dog,

oleoresin of aspidium.
or CCl_4 2-4 cc.

These lower segments may become separated from the head of the parasite and may be discharged with the feces. The presence of these segments in the stool is the most conclusive evidence of the tapeworms.

Symptoms.—The outstanding symptom is bulima, yet there are occasionally cases encountered that have no symptoms whatever. Most patients complain of abdominal discomfort; it may consist of a sense of hunger, colicky pain, or fullness. Severe itching around the anus is common in many cases; occasionally there is itching of the nose as when having a bad cold. Many cases are highly nervous and affected with spasmodic tic, while some extremely nervous patients may have convulsions. In the course of time the skin becomes pale due to anemia, and there is also emaciation and debility. Occasionally a hearty meal relieves the patient of all the subjective symptoms.

II. **Roundworm,** also known as Ascaris lumbricoides—The ova enter the human body by means of food and drink. The roundworm is very similar to the ordinary angleworm, being of a light brown color with a round body slightly pointed at both ends; it varies from four to ten inches in length and is about one-eighth inch in diameter. The female worm is larger than the male. The roundworm inhabits principally the small intestine but may migrate to remote parts of the body.

Symptoms.—Many cases present no symptoms but intermittently pass one or more of the worms. Sometimes a single case may have hundreds of these roundworms; therefore, it would not be unusual to pass masses of them. They are much more common in children or young adults. As a rule, there is gastro-intestinal disturbance with nausea, vomiting, diarrhea, and alternating constipation. Sleep is disturbed; the child frequently has bad dreams or nightmares. Grinding of the teeth is common but by no means pathognomonic of this disease. Occasionally obstructive constipation occurs with meteorism and abdominal distention. The real danger from this

worm lies in the fact that it may migrate from the intestine into the bile ducts and pancreatic duct with resulting abscesses. They have been known to migrate through the stomach and esophagus into the nasopharyngeal cavity and thence through the eustachian tube to the middle ear. They frequently migrate through the anus without bowel movement and may enter the urethra or vagina in the female.

III. **Threadworm** or **Oxyuris vermicularis** is also called the seatworm. In gross appearance it resembles a piece of white thread. These worms measure from one-sixth to one-half inch in length. They develop in and inhabit the large intestine, especially the rectum. Occasionally they migrate to the sexual organs, where they produce intense itching. These worms produce intense itching around the anus with tenesmus. The stool usually contains considerable mucous. They are easily eradicated and as a rule do not produce constitutional symptoms.

DISEASES OF THE LIVER

Jaundice

Definition.—Jaundice is a yellowish discoloration of the skin due to the presence of bile pigment in the body fluids. The vast majority of cases result from obstruction of the biliary vessels. These include the common bile duct, the hepatic duct, and the small intralobular ducts. The most common cause of obstruction is inflammation of the bile ducts, but they may be obstructed by spasm, gallstones, parasites, adhesions, or pressure of growths.

Jaundice is detected by uniform yellow pigmentation of the sclera of the eye and the skin. Bile appears in the urine in abundance and may be found in the sweat and other glandular secretions. The stool is clay colored due to bile deficiency. Accompanying these symptoms are those of the pathologic condition responsible for bile duct obstruction.

Acute Catarrh of the Bile Duct

Definition.—Acute catarrh of the bile duct is a nonspecific inflammation involving the lining of these ducts. It is associated with gastritis or duodenitis, and all are a part of one pathologic process.

Adjustment.—The biliary apparatus is supplied by the splanchnic nerves; therefore, adjustments are indicated particularly between the fifth and ninth thoracics. Lower dorsal adjustments increase kidney action and hasten elimination of retained bile.

Pathology.—The mucous membrane of the common bile duct and the adjacent duodenum are hyperemic and edematous. The edema is due to infiltration of serum and cells in the submucous tissue. The lumen of the bile duct is diminished in size and may be completely occluded. Bile is absorbed from the liver through the rootlets of the hepatic vein and conveyed to the systemic circulation which distributes it to all tissues in the body.

Symptoms.—Most cases of catarrh of the bile duct begin with mild digestive disturbances. These consist of epigastric distress, loss of appetite, nausea, and vomiting. The tongue is coated, and the breath has foul odors. The body temperature is somewhat above normal but rarely exceeds 102 degrees. After a few days' duration the jaundice becomes apparent as a subicteric tint in the conjunctiva, and later the yellowish discoloration is apparent over the entire surface of the body. The urine is dark in color, and chemical examination will reveal the presence of bile. The stools are clay colored and have an unusually fetid odor. Intermittent diarrhea is not uncommon. There is a dull temporal headache which is accompanied by mental dullness. Pruritis may annoy the patient greatly, particularly sensitive patients.

Examination of the abdomen may reveal the lower border of the liver to extend below the costal margin. The liver area

is tender; this tenderness is readily traceable along the intercostal spaces to the middle dorsal area of the spine. Proper adjustments, rest in bed, and an ample supply of liquids lead to prompt recovery in ten days to two weeks. The discoloration of the skin and the highly colored urine may continue for an additional week or two.

Chronic Catarrh of the Bile Duct

Definition.—Chronic catarrh of the bile duct is a prolongation of acute catarrh wherein the lining of the duct is thickened and obstruction is produced.

Adjustment—Nerve impingements influencing chronic jaundice will be found in the middle and lower dorsal areas of the spine.

Pathology.—Chronic inflammation of the bile duct usually occurs when there is a continual irritation, such as may be produced by a gallstone in the ampulla of Vater. This stone has a ball-valve action which permits a change of position. At times the obstruction is complete, and other times it is partial; hence intermittently bile is permitted to flow around the stone and appears in the stool. At other times the flow of bile is prohibited entirely during which the jaundice deepens as a result of increased absorption.

Symptoms.—A history of previous attacks of hepatic colic precedes the development of chronic jaundice. As a rule there is no fever, the jaundice gradually increasing in severity. There is marked intestinal putrefaction and sluggishness of the bowels due to a deficiency of bile. The sweat and other secretions are tinted by the presence of bile pigment. The conjunctiva is deeply icteric. The stools are clay colored but may contain quantities of pure bile at times when the stone permits its flow. The upper right section of the abdomen is tender, and the liver may be enlarged and palpable. There may be subsequent attacks of hepatic colic due to the passage

of additional gallstones or an attack may be initiated by contractions upon a large stone in the ampulla.

Prolonged intestinal indigestion and putrefaction lead to emaciation and weakness. Most patients become depressed. They frequently complain of yellow vision which is caused by bile pigment in the humors of the eye. As a rule this latter symptom is a late development and is not found in jaundice of short duration.

The X-ray is of value in determining the presence of stones in the gallbladder or in the ampulla of Vater. Large stones in the ampulla may require surgical removal, but even in that event adjustments following removal are extremely beneficial in eliminating the pigments stored in the tissues and the accompanying toxemia.

Suppurative Inflammation of the Bile Duct

Definition.—Suppurative inflammation of the bile duct is infectious in character and usually follows the passage of gallstones.

Adjustment.—The middle and lower dorsal areas of the spine should be adjusted according to findings.

Pathology.—During the passage of gallstones the mucous lining of the duct may be bruised or lacerated and, therefore, became highly susceptible to infection. The majority of people harbor pathogenic bacteria. When these bacteria are brought to a favorable environment by the circulation, they succeed in establishing a domicile; and infection is the result. The blood vessels in the wall of the duct become engorged; fluid and cells are infiltrated in available spaces; and pus cells are formed and discharged through the follicles or by perforating the wall of new abscesses. It is possible that the inflammation spread to the gallbladder and biliary passages.

The onset of suppurative cholangitis is sudden with chilliness, fever, and severe pain in the epigastric and right hypochondriac areas. The fever may be remittent or intermittent.

Respiratory movements are inhibited because they intensify the pain. The hippocratic countenance with its attending features will be noted. Jaundice shows in the conjunctiva of the eye and skin in a few hours or days. The urine contains an abundance of bile and indican. Early adjustments restore a normal nerve function. Resistance toward infection is increased, and as a rule the inflammatory process is arrested in a few days.

Icterus Neonatorum

Definition.—Icterus neonatorum is a jaundice condition of the new born. There are two forms: the milder physiological form and the severe pathological form. The former is said to exist in approximately one-third of all infants. This type of jaundice is believed to be hemolytic in nature being brought about by the readjustment of the circulation after birth.

The severe or pathological form may result from congenial absence of the bile duct or congenital growths or gummas which completely occlude it. In such cases the outlook for recovery is not favorable.

Symptoms.—The mild or physiological form shows evidence of jaundice on the second or third day after birth. Its customary duration is one week. A jaundice will be visible in the conjunctiva and skin. The stool is clay colored and has a very fetid odor. The urine contains a trace of bile. Occasionally a severe case is protracted for several weeks or months during which time the infant looses weight and becomes emaciated; however, the abdomen is enlarged and distended. These are the cases that are most commonly brought to a chiropractor as a last hope. Proper adjustments of the middle and lower dorsal areas usually lead to prompt recovery.

The pathological form usually appears about five days after birth. The temperature is somewhat elevated and follows a remittent course. The pulse and respiration are rapid. Most cases present severe vomiting and diarrhea. Gastrointestinal hemorrhage may develop. The infant usually enters a comatose state and expires in a few days.

Gallstones

Definition.—Gallstones result from crystallization and cohesion of the calcareous elements of bile and from an excess of cholesterol. Cholelithiasis is another name for gallstones.

Adjustment.—The liver cells are responsible for the chemical composition of the bile. A normal flow of secretory impulses to these cells maintains their integrity and enables them to maintain a normal biliary secretion. Interference with the flow of secretory impulses impairs the process of secretion and results here in alterations in composition. When the bile becomes saturated with cholesterol and bile salts, they tend to precipitate. Spinal adjustments which remove nerve interference will restore normal secretion, thus precluding the development of gallstones. Upper cervical and middle dorsal adjustments are indicated to restore normal balance between the sympathetic and parasympathetic supply of the liver.

The pain of hepatic colic is caused by propulsion of the stone through the cystic and common bile ducts. Middle dorsal adjustments of a stimulative character inhibits this peristaltic activity and cause cessation of the pain. 4th or 5th dorsal adjustments are most effective in relieving the pain early in an attack. Toward the end of the attack 7th, 8th, or 9th dorsal adjustments give prompt relief. The reason for this variation is that as the stone is propelled, it moves from one visceral zone to another.

Pathology.—Gallstones gradually develop as bile salts crystalize in the presence of an abundance of cholesterol. In addition to a secretory disturbance of the liver cells, the formation of stones may be favored by statis in the gallbladder as a result of deficient nerve supply or deficient stimuli in the duodenum. Infection plays a very minor role if any; but diet, exercise, and normal bowel movements are of utmost importance.

Section of a gallstone shows it to be laminated. The layers

vary in color, the dark layers apparently being formed when the bile was highly concentrated, and the lighter layers when less pigments were available. Stones may vary in number from one to several hundred. They differ in size from grains of sand to that of an egg. When stones are numerous or large, they are faceted at the point of contact with each other.

Nerve Tracing.—Most patients having gallstones complain of dull pain under the right shoulder blade. Proper examination procedure will reveal tenderness leading from the epigastric region along an intercostal nerve to the middle dorsal spine. This tenderness is indicative of the point at which nerve interference is situated.

Symptoms.—Gallstones may exist in the gallbladder with no symptoms whatever; more often, however, patients complain of chronic indigestion. They have vague sensations, difficult to describe. Their appetite frequently is fully satisfied after but little food. They are often nauseated after eating. This is especially true of a diet rich in fats. Many gallstones are not opaque to the X-ray, therefore, can only be discovered after administration of a dye. Gallstones which are opaque are often accidentally discovered in making spinal X-ray pictures.

Hepatic colic begins when the stone leaves the gallbladder and enters the cystic duct. The stone is propelled by a series of peristaltic contractions on the one hand and is resisted by reflex contractions created by pain on the other hand. The pain begins in the upper abdomen and sharply radiates toward the right side and right shoulder. The pain is most intense and agonizing. The patient promptly becomes nauseated and may vomit several times during an attack. Some attacks of hepatic colic are marked by hysterical activity including screaming, crying, pulling the hair, tearing the bed clothes, or rolling upon the floor. During the attack the patient perspires profusely. The facial expression reveals intense suffering and

anxiety. The abdominal muscles in the upper right quadrant are contracted, thus inhibiting normal respiration. Some cases have a slight elevation in the body temperature. The pulse and respiration rate are markedly increased, out of proportion to the rise in temperature. Subjects having heart disease and prone to fainting are very apt to have syncope. Jaundice may not be present unless the attack is of unusually long duration or when there has been a series of attacks. When jaundice is discoverable, the urine shows bile pigment. An attack may last less than an hour or for several days with intermissions; during an intermission the stone is not being propelled.

Differential symptoms.—Hepatic colic differs from right renal colic in that the pain of renal colic begins at the back or side and radiates obliquely downward toward the bladder, while in hepatic colic the pain radiates toward the right shoulder and middle dorsal spine. In renal colic there is vesical irritability, often hematuria, but no jaundice; and in renal colic the abdominal contractions are largely in the lower right quadrant. In hepatic colic urinary symptoms are absent and the reflex contractions are predominately in the upper right quadrant of the abdomen. In right renal colic deep pressure on the right side of the lower dorsal or lumbar spine will relieve the pain and the proper stimulative adjustment abort it. In hepatic colic deep pressure on the right of the middle dorsal spine will relieve the pain, and the proper stimulative adjustment will abort the attack.

In appendicitis the pain becomes localized at McBurney's point. There is a noticeable elevation of the temperature. The abdominal contractions are in the lower right quadrant, and the blood shows a leukocytosis. The urine usually contains indican. Nerve tracing in appendicitis leads to the upper lumbar spine while in hepatic colic the tenderness leads to the middle dorsal spine.

Acute Cholecystitis

Definition.—Acute cholecystitis is an inflammation of the gallbladder characterized by jaundice and abdominal pain.

Adjustment.—The middle and lower dorsal areas of the spine should be carefully examined and adjustments made according to findings.

Pathology.—Cholecystitis is usually suppurative in nature and associated with acute cholangitis. The gallbladder and cystic and common bile ducts are congested and swollen. The gallbladder is distended. The mucous membrane which is greatly swollen is covered with mucopurulent or purulent exudate. There may be exfoliation of the superficial epithelium. Hence, the gallbladder may be transformed into an abscess or become gangrenous and perforate into the peritoneum with a resulting peritonitis.

Nerve Tracing.—The course of tenderness leads from the epigastric region on the right side along the course of the intercostal nerves to the middle dorsal region of the spine.

Symptoms.—When cholecystitis is catarrhal in nature, its symptoms are relatively mild. They consist of indigestion, epigastric tenderness, nausea, and occasional vomiting. When infectious or suppurative, there is high fever with its accompanying symptoms. The pain is severe and paroxysmal. There is marked rigidity of the rectus abdominis in the upper right quadrant of the abdomen. Nausea and vomiting become pronounced. The abdomen may be distended and occasionally the gallbladder is palpable. When the common bile duct is involved, there will be jaundice. The fever tends to follow an irregular course; there being chills, fever, sweats, and great prostration. The facial expression is anxious and respiration is of the superior costal type.

Hyperemia of the Liver

End of 3rd test

Definition.—Hyperemia of the liver may be active or passive. In the active form the arteries are dilated and distended with blood. In passive hyperemia the veins are distended.

Active hyperemia may be inflammatory or non-inflammatory; the former exists as part of inflammations, and the latter is a vasomotor neurosis. Passive congestion is the result of back pressure of blood in the hepatic vein or inferior vena cava. Enlarged organs or pressure by tumor resist venous drainage. Most cases of passive hyperemia are the result of a failing myocardium whether associated with or without valvular disease.

Adjustment.—In active hyperemia of the liver corrective adjustments are required in the splanchnic area of the spine. In passive hyperemia upper dorsal adjustments are required when there is a failing heart. Local adjustments should be given in the dorsal area according to the location of visceral enlargement or growth.

Pathology.—The active hyperemia which follows the ingestion of a large meal is purely functional and does not produce structural changes in the organ. In active hyperemia the liver is uniformly enlarged and congested. When the active hyperemia is the result of inflammation, the structural changes may be extensive and vary with the nature of an infection. In addition to enlargement and engorgement, there may be diffuse infiltration of cells, scattered areas of necrosis, and the development of abscesses.

In passive hyperemia of the liver the organ is greatly enlarged and engorged with blood. When of long standing peripheral parts of the liver undergo atrophy. This causes a cross section to be variegated, from which the name nutmeg liver is obtained. Cells in the atrophied area of the liver may undergo degenerative changes, particularly fatty.

Symptoms.—Slight degrees of active hyperemia occur without the production of symptoms. When pronounced there is a sensation of fullness and discomfort after eating a hearty meal. There is frequently headache, languor, lassitude, and mental depression. After frequent recurrences the complexion

becomes sallow, and the patient suffers with constipation and flatulence. When the congestion is inflammatory, symptoms of the primary condition will be associated. This may include symptoms of cholecystitis, cholangitis, and abscess of the liver.

In passive congestion of the liver the organ is greatly enlarged, smooth, and tender. The patient has a feeling of fullness in the right hypochondrium; digestive disorders are continuously present. Should tricuspid incompetency develop, pulsation will be palpable during the systole of the heart. There may be slight jaundice, clay colored stools, and bile pigment in the urine. Ascites when present is usually due to compression of the portal vein by the engorged liver. Edema in the lower extremities is cardiac in origin. In the main these patients have more symptoms of the associated heart condition than those which may be attributed to engorgement of the liver.

Abscess of the Liver

Definition.—An abscess is a circumscribed inflammatory lesion consisting of encapsulated pus. It is characterized by tenderness, pain, and disordered function of the liver.

Adjustment.—Adjustments are indicated in the middle and lower dorsal areas of the spine.

Pathology.—An abscess may develop during the process of a suppurative hepatitis, or it may be induced by the lodgment of pus embolus. The abscesses may be single or multiple; when single an abscess may perforate into the bile duct with ultimate recovery. Multiple abscesses tend to terminate fatally.

Symptoms.—The onset of hepatic abscess varies with the associated conditions responsible for the abscess. The development of an abscess in the liver will be marked by pain of increasing intensity which radiates toward the right shoulder and middle dorsal spine. Breathing, coughing, and abrupt movements are suppressed. The hippocratic countenance is

usually present. The body temperature will vary from 101 to 105 degrees. Chills may be recurrent, and there are usually profuse drenching sweats. There is a marked tendency for the patient to lie upon the right side as this tends to mobilize the abdomen and restrict respiratory movement. There are always digestive disturbances consisting of anorexia, nausea, eructations, and vomiting. Constipation is the rule, yet there may be intervals of severe diarrhea. Abscess of the liver is one of the most painful diseases causing enlargement of that organ.

Cirrhosis of the Liver

Definition.—Cirrhosis of the liver is a chronic fibroid degeneration of the organ affecting the connective tissues of either the portal or biliary vessels.

By custom the term cirrhosis has become synonymous with fibrosis, although originally it pertained to the color of the surface of the liver.

Adjustment.—Early adjustments are indicated throughout the splanchnic area of the dorsal spine, particularly at the level of the 8th and 9th dorsal.

Pathology.—**Atrophic cirrhosis** is frequently found in subjects of chronic alcoholism. The connective tissue constituting Glisson's capsule becomes thickened and contracts. This change follows the course of the portal vein into the liver substance. The contracting bands of connective tissue compress portions of the lobules causing them to bulge, and from this arises the name hobnail liver. During the earlier stages the liver as a whole is enlarged. In due time the liver cells are compressed and undergo atrophy. It is this obstruction of the portal system which causes enlargement of the spleen and engorgement of the stomach and intestines which leads to ascites.

Biliary cirrhosis is also called hypertrophic cirrhosis. It is a rare disease and more common in early adult life. The liver

is uniformly enlarged with a smooth surface which is dark green in color. The organ is firm under pressure. A dense fibrosis involves the lobules and their ducts. Catarrhal inflammation may include many small bile ducts and accounts for jaundice, which is usually slight.

Symptoms.—Atrophic cirrhosis—since no pain exists, many cases of advanced cirrhosis develop before the patient is aware of the existence of a disease. At the first consultation the patient may admit that he has had a poor appetite, that his tongue has been coated, and that his breath was foul for some months; but he thought it was due to constipation. Many patients observe a decrease in the size of the neck, shoulders, and arms but counterbalance this with the fact that the scales prove they have not lost weight. Upon attempting exercise the patient becomes exhausted, has shortness of breath, and is aware of palpitation of the heart. There is often a slight fever up to 100 degrees. The superficial abdominal veins around the umbilicus are distended forming the caput medusæ. Ascites gradually develops, often becoming enormous. The enlarged abdomen with marked decrease of flesh in the upper part of the body gives the patient a characteristic appearance and posture: the head and shoulders are carried far back to balance the enlarged and heavy abdomen. The spleen is often palpably enlarged and may show a distinct notch on the side of its hilus. The gastric, intestinal, and rectal veins are engorged. Varicosities frequently develop; upon rupturing there will be hematemesis or tarry stool. Hemorrhoids annoy these patients intensely. The rupture of large varices proves fatal in approximately one-fifth of the cases. All cases are highly susceptible to infectious diseases. Patients suffering with cirrhosis become depressed and have headaches, loss of memory, and a great tendency toward somnolence.

Hypertrophic cirrhosis—the onset of hypertrophic cirrhosis is gradual with gastro-intestinal symptoms consisting of eructations, pain, vomiting, and diarrhea. There is a slight

jaundice which persists throughout the disease, often becoming marked in the advanced stage. The liver is evenly enlarged and hard; its lower border may descend to the umbilicus. The stools are clay colored yet usually contain some bile. Bile is constantly present in the urine. The abdominal veins are not distended, nor is there ascites. The duration is from one to two years, and the termination is often sudden with high and irregular fever indicative of severe toxemia.

Fatty Liver

Two forms of fatty liver are recognized, namely, fatty infiltration and fatty degeneration.

Fatty infiltration is usually associated with obesity and is a part of it. It is induced by endocrine disturbances, overeating, and conditions which reduce oxidation, such as those diseases causing secondary anemia. There are no definite symptoms which circumscribe this disease to distinguish it from the obesity of which it is a part. The liver is enlarged but painless. It is difficult to palpate because of the thick abdominal wall; however, hepatic dullness may extend to the umbilical line. Underactivity of the liver is indicated by clay colored stools. The enlarged liver tends to raise the diaphragm and together with excessive accumulations of fat around the heart may be responsible for shortness of breath and palpitation upon exertion.

Fatty degeneration is a result of metamorphosis within the liver cells. It is apt to result from alcoholism or poisoning by phosphorus, arsenic, and chloroform. The case history is of value in judging the presence of fatty degeneration. Usually there are dull headache, malaise, anorexia, and abdominal discomfort. Jaundice may develop late in the disease, at which time the stools become clay colored and the urine contains bile. Discontinuance of the use of alcohol and a well-balanced diet, containing moderate amounts of protein but little fat with ample fruits and vegetables to supply needed vitamins, is bene-

ficial even in advanced cases. Corrective adjustments, particularly in the dorsal area of the spine are necessary; otherwise, there is a tendency toward diffuse hemorrhages, cerebral symptoms, and the typhoid state.

Amyloid Liver

Definition.—Amyloid liver is a secondary disease wherein the liver tissue becomes converted into a waxy or amyloid substance. It is associated with similar changes in the spleen and kidney and generally follows a chronic suppurative disease.

Adjustment.—Corrective adjustments must be directed toward the chronic inflammatory process responsible for the production of pus. The inflammation may be located in the lung or large bones in tubercular necrosis, particularly in the latter in osteomyelitis.

Pathology.—The liver becomes pale in color and is greatly enlarged; it may attain several times its normal weight. The enlargement is chiefly the result of the formation of amyloid material which begins in the vessels and finally invades the parenchyma of the entire liver. Amyloid reacts the same as starch to the iodine test; this is the chief reason for the name amyloid.

Symptoms.—The case history usually reveals the presence of a chronic suppurative disease of long duration: chronic tuberculosis, tertiary syphilis, and osteomyelitis are common antecedents. Having been in ill health, the patient appears undernourished and pale. He may be decidedly emaciated but is rarely jaundiced. Abdominal examination reveals an enlarged liver palpable far below the costal margin and showing dullness which is continuous from the lower border to the dome of the diaphragm. The spleen is likewise enlarged and palpable. Large quantities of urine containing albumin and waxy casts are voided. The duration is variable depending upon alleviation of the suppurative foci responsible for amyloid metamorphosis.

amyloid liver is always a secondary disease.
for amyloid Liver give
+ Iron, cod liver oil + liver extract (Beef liver)

Carcinoma of the Liver

Definition.—Carcinoma of the liver is a malignant growth delivered from the epithelial tissue and characterized by emaciation, cachexia, and disordered function of the liver.

Adjustment.—Since carcinoma of the liver is usually secondary to that of the stomach and intestines, reference should be made to adjustment under carcinoma of the intestine.

Pathology.—Primary carcinoma of the liver is very rare. Usually the primary growth is situated in the bile ducts, gallbladder, stomach, or intestines. The growths in the liver are of metastatic origin and vary according to the type of the primary tumor. Often they are nodular-shaped tumors scattered throughout the organ. Occasionally there is a single massive growth involving the major portion of the liver. In other cases the entire liver is the site of small white colored nodules found both in the substance of the organ and upon its surface.

Sarcoma of the liver is usually called cancer. The condition is rare, but when present it consists of a single massive growth, which is the result of metastasis from primary growths in bones, pleura, peritoneum, or skin.

Symptoms.—Most cases of hepatic carcinoma give a history of prolonged digestive disturbances which, no doubt, result from the primary growth in the stomach or intestines. When the liver becomes involved, there is pain in the upper right quadrant of the abdomen. Jaundice develops and increases as a result of the progressive obstruction of the intralobular ducts. The abdomen becomes enlarged, and the enlarged liver is palpable in the right hypochondrium. This increases the area of hepatic dullness, and the anterior surface of the liver which projects below the costal margin may appear nodular upon palpation—a very significant physical finding. There is progressive loss of flesh and strength. If the portal vein becomes obstructed, ascites will develop. In the latter stages there may be vomiting, gastrointestinal hemorrhages, and intestinal obstruction. The duration rarely exceeds one year.

DISEASES OF THE PANCREAS

Pancreatitis

Definition.—Pancreatitis is an inflammation of the pancreas which may be toxic, infectious, or traumatic. When hemorrhages occur into the substance of the organ, it is known as **hemorrhagic** pancreatitis. When pus forms, it is called **suppurative**; and when thrombosis occurs, it is called **gangrenous.** The conditions, simple, hemorrhagic, suppurative, and gangrenous pancreatitis, are possible stages of one disease process —they are not separate diseases.

Adjustment.—The spinal cause of pancreatitis lies in the middle dorsal area, at which point there is interference with the flow of impulses through the sympathetic nerves supplying the pancreas.

Pathology.—In simple pancreatitis there are engorgement of the pancreatic vessels and edema of the organ; these cause enlargement. As this stage becomes chronic, the interstitial connective tissue increases with some degree of atrophy in the parenchymatous cells. This inhibits the pancreatic secretions, both internal and external. Thus, there may be impairment of carbohydrate metabolism and intestinal indigestion, the latter because of the absence of steapsin, trypsin, and amylopsin. Engorged vessels may rupture causing numerous hemorrhagic areas in which blood fills available areolar tissue spaces, or the hemorrhage may occur into the ducts. When suppuration occurs, multiple abscesses tend to form; these are highly destructive to the pancreatic tissue. As obstruction of some pancreatic vessels become complete, portions of the pancreas may become asphyxiated and undergo gangrenous necrosis. Suppuration and gangrene are advanced changes which develop in those cases having unfavorable prognosis.

Symptoms.—The onset is sudden beginning with an attack of indigestion. In the upper part of the abdomen there is severe deep seated pain that frequently radiates into the left

shoulder at the level of the lower angle of the scapula. Chilliness precedes an elevation of the temperature which in the simple cases is very moderate. There are difficult breathing, often cyanosis, and hiccup. The hiccup is due to irritation of the diaphragm or the terminations of the phrenic nerve. Subsidence of the hiccup depends upon normalization of the pancreas. This type of hiccup is not to be confused with those due to other causes. Usually there is diarrhea with a fatty stool, a result of the suppression of steapsin. The simple or catarrhal form may continue from one to two weeks with gradual recovery. When hemorrhage occurs, there are a reduction in the body temperature, an anxious facial expression, a thready pulse, and a shallow respiration. The patient will complain of air hunger.

If suppuration or gangrene takes place, there will be an increase in the temperature, with the probability of recurring chills, high fever, and sweats. Urine examination will reveal indicanuria, and a blood count will disclose a leukocytosis.

Chronic pancreatitis is the result of a simple or catarrhal inflammation becoming chronic and inciting proliferation of the connective tissues. The pancreas becomes fibroid and its function is seriously disordered. There is persistent tenderness in the epigastrium, and the patient complains of dull pain radiating toward the spine at the level of the shoulder blades. The stools may be copious and have light color and foul odor. Jaundice is not uncommon because of pressure upon the common bile ducts by the enlarged head of the pancreas. These symptoms may persist over a long period of time with remissions in intensity and slight improvement in health.

Carcinoma of the Pancreas

Definition.—Carcinomas of the pancreas are usually of the type known as adenocarcinoma. The most common site of development is the head of the pancreas; here they involve the duct of Wirsung and the common bile duct.

Symptoms.—The disease has an insidious onset with dull aching pain situated deep in the epigastrium. The pain is subject to exacerbations at irregular periods. There are nausea, vomiting, and pressure symptoms due to pressure upon adjacent organs. Jaundice will result from pressure upon the common bile duct; delayed digestion and vomiting may result from pressure upon the duodenum; edema of the lower extremities and abdominal organs may result from pressure upon the inferior vena cava; pressure upon the celiac plexus further impairs nervous control of the abdominal viscera. Emaciation, weakness, and cancerous cachexia are progressive, while fatty stools are continuous. Glycosuria may develop and a blood count may reveal a reduction in the red cells.

The head of the pancreas may be palpable as a tumor in or near the epigastrium. The symptoms give evidence of its nature and location.

Pancreatic Cyst

Definition.—Pancreatic cysts are usually of the retention type due to obstruction of the duct of Wirsung. They are generally associated with chronic pancreatitis but occasionally result from the impaction of pancreatic calculi.

Adjustment.—Adjustments are indicated in the middle dorsal areas just as in cases of pancreatitis.

Pathology.—Obstruction of the duct of Wirsung by the enlarged head of the pancreas, growth, or calculus causes the pancreatic juice to be retained in the pancreatic ducts. The ducts and lobules of the gland become distended. Secretion diminishes and the lobules undergo atrophy.

Symptoms.—The case history will be that of chronic pancreatitis or a recent attack of pancreatic colic from which the patient has not fully recovered. There is pain predominately in the upper left quadrant of the abdomen. The enlarged pancreas may be palpable as an oblong tumor lying transversely

above the umbilicus. There are nausea, vomiting, pain, and sensations of abdominal fullness. Pressure symptoms arise from all organs subjected to pressure of the cyst. If a calculus escapes, there is prompt improvement. In most cases, however, chronic pancreatitis results with a fatal termination.

Pancreatic Calculi

Definition.—The pancreatic calculi are the result of crystallization and cohesion of calcareous elements in the pancreatic juice. They are usually composed of calcium phosphates or calcium carbonates. They develop in the duct of Wirsung and as a rule do not create symptoms. Either the calculi pass into the intestine from time to time or remain in the duct until death. When a reasonably large pancreatic calculus is moved into the duct of Wirsung, it excites an intense pain of sudden onset. The pain radiates transversely through the upper abdomen along the left costal margin toward the angle of the left scapula. Reflex contractions are observable in the upper left quadrant of the abdomen. The facial expression is anxious and the skin is pale and moist. Middle dorsal adjustments which increase the flow of inhibitory impulses will abort the attack.

DISEASES OF THE PERITONEUM

Acute Diffuse Peritonitis

Definition.—Acute diffuse peritonitis is an acute inflammation of the peritoneum characterized by fever, pain, and prostration.

Adjustment.—The adjustment in acute peritonitis varies in accordance with the location of the primary lesion. Discoverable nerve interference from the 8th dorsal to the lower lumbar region should be corrected.

Pathology.—The anatomical changes which occur in peritonitis differ according to its points of origin, whether it is infective or non-infective, and the stage attained. At the out-

set there is a marked change in the vascularity of the peritoneum at the point of inflammation. The surface becomes covered with a layer of sticky fibrin which tends to promote adhesions, the amount of fibrin varying with the microorganisms present. In diffuse peritonitis this hyperemia and exudative fibrin spread to the entire peritoneum except as it may be restricted by the omentum or mesenteries. The exudative fibrin is followed by an effusion of serous fluid of varying quantity, color, and consistency. The serous fluid always contains white blood cells which undergo suppuration in the purulent stage. In the first stage the condition may be called fibrinous peritonitis. In the second stage it is referred to as serofibrinous, and in the third stage as purulent or empyema of the peritoneum. Since peritonitis may be induced by trauma, perforation of an ulcer, carcinoma, or infection, the process is subject to numerous modifications. Perforation adds blood to the effusion, and pyogenic organisms may cause pus to form within twenty-four hours.

Symptoms.—Acute peritonitis is manifested by a sudden onset with chills and fever ranging to 105 degrees. There is intense abdominal pain aggravated by any body movement. The patient assumes the dorsal rigid posture in which the recti muscles are contracted, the thighs are flexed upon the abdomen, and respiration is of the superior costal type. The characteristic hippocratic countenance which is indicative of friction pain is always present. The pulse at first is large, rapid, and of good tension; but as collapse develops the pulse becomes small and finally thready. The spleen is often enlarged and may be displaced by the effusion. Effusion above the omentum may displace the stomach, liver, and transverse colon. Talking, sneezing, and coughing increase the pain and are accordingly suppressed. The face takes on a pinched appearance: in this the nose appears sharp, the eyes sunken, and the temples depressed; the ears may become cold; and the entire face may have a livid or deathly pallor. Irritation of

the diaphragm may cause hiccups which are intensely painful. Vomiting may occur with trivial effort. In unfavorable cases death is preceded by the symptoms of collapse.

Acute Localized Peritonitis

Definition.—Acute localized peritonitis is a term designating an inflammation confined to a part of the peritoneum.

Adjustment.—Adjustment should be made in the zone of the part involved. If the peritonitis is associated with cholecystitis, the adjustment is in the middle dorsal area; if with appendicitis, lower dorsal or lumbar; if with ovaritis, middle lumbar. Nerve tracing is of value in locating the spinal area involved.

Pathology.—Most cases of acute localized peritonitis are confined to the fibrinous stage. The peritoneal vessels in the vicinity of the diseased organ become distended and engorged with blood. There is infiltration of serum and cells in the peritoneum and subserous areolar tissues. There is an exudate of fibrin and serum from the inflamed surface. Adhesions may form and the inflammatory process subsides. The fibrin and serum are quickly absorbed. If the inflammatory process is prolonged and infectious, the condition becomes diffuse in nature.

Symptoms.—The onset of acute localized peritonitis is with pain and a moderate rise of body temperature. The pain is localized in the region of the gallbladder, appendix, ovary, or other lesion elsewhere in the abdomen. The pain is increased upon motion, hence the patient tends to suppress all body movements. The dorsal rigid posture develops but is less marked than in diffuse peritonitis. The respirations are short, shallow, and of the superior costal type; there is often an expiratory "grunt." Examination of the abdomen discloses marked tenderness over the site of the inflammation. Likewise there is muscular rigidity on the side affected.

The term subphrenic peritonitis is applied to inflammation occurring below the diaphragm and above the omentum. This

Subphrenic = below diaphragm + above omentum.

type may be associated with a perforating peptic ulcer, cholecystitis, or abscess of the liver. An effusion in this area will displace the liver, pancreas, stomach, or the spleen. Palpation and percussion are of value in detecting such displacement. Friction sounds may be audible upon deep breathing if pain permits such movement.

The term localized peritonitis is rarely used as a diagnosis; therefore, it is a term used to indicate or explain the cause of a complex of symptoms occurring with perforating ulcers, cholecystitis, appendicitis, diverticulitis, ovaritis, or salpingitis.

Chronic Peritonitis

Definition.—Chronic peritonitis is most commonly a tubercular process which causes a thickening and hardening of the peritoneum.

Adjustment.—Adjustments should be made locally according to the affected zones.

Pathology.—Chronic peritonitis may be a continuation of acute localized peritonitis. More commonly it is tubercular or cancerous. There are proliferation of the connective tissue element and the development of extensive adhesions. From the onset there are hyperemia, edema, and fibrinous exudate. Circumscribed collections of fluid may become encysted by adhesions. The ascitic fluid in tubercular peritonitis contains a multitude of lymphocytes, while in carcinoma of the peritoneum the fluid contains blood.

Symptoms.—The symptoms of chronic peritonitis are variable. There may be recurrent abdominal pain associated with nausea and vomiting. There are slight fever and increase in pulse and respiration rate. Often abdominal enlargements cause visible distention, or they are readily palpable. The intestines may become obstructed by peritoneal adhesions; this leads to symptoms of intestinal obstruction. In tubercular cases the patients often are of the tuberculous diathesis. There

is the hectic type fever of afternoon and evening duration; the morning temperature is subnormal; there are usually night sweats. Constipation and diarrhea may alternate. It is not uncommon that tuberculous activity exists elsewhere and is indicated by local symptoms. When the peritonitis is cancerous, there are progressive emaciation and debility. Secondary anemia and cancerous cachexia develop. Abdominal palpation reveals nodules or massive enlargements. The ascitic fluid yields blood, and there are hemorrhages into the alimentary tract.

Ascites

Definition.—Acites is a collection of fluid in the peritoneal cavity. It is characterized by distention of the abdomen and displacement of the abdominal viscera. The term ascites is restricted to noninflammatory effusions. Ascites is a symptom rather than a disease. Its three most common causes are congestive failure of the heart, nephrosis, and obstruction of the portal vein, the latter by portal cirrhosis or hepatic growths.

Adjustment.—Necessary adjustments vary according to the primary condition of which ascites is a symptom. Adjustments are indicated in the upper dorsal region in cases of congestive heart failure, in the middle dorsal in portal obstruction, in the lower dorsal region in kidney affections.

Symptoms.—The abdomen gradually becomes enlarged with a bulging in the upper groin. The skin has a stretched tense appearance. The umbilical veins are distended in those cases caused by portal obstruction. In congestive heart failure there is fatigue, breathlessness, and thoracic pain. The pulse is rapid, small, and often irregular. There are physical signs denoting edema at the base of the lungs. In cases of renal origin there is renal pallor, oliguria, and changes in the constituency of the urine as revealed by chemical and microscopic examination. There is a marked shifting of the abdomen from side to side as the patient changes his position in bed from left to right or vice versa. Percussion reveals dullness in that

Most common is—portal obstruction heart failure & nephrosis.

part of the abdomen nearest the bed because the fluid will seek its lowest level and float gas-filled pockets of intestine to a higher level. There may be additional concomitant symptoms of the disease causing the ascites.

Retroperitoneal Sarcoma

Definition.—Retroperitoneal sarcoma is a malignant growth derived from connective tissue elements and situated behind the peritoneum.

Most retroperitoneal sarcomas arise from the spine or the fibrous tissue around it. They are predominate in relatively young people and frequently have a history of trauma. They may have round cells, spindle cells, or mixed cells. Sarcomas have but little intercellular substance, and often the blood flows through channels lined by sarcomatous cells; thus there is a great tendency to metastasis. The lung is the most common location of such metastatic sarcomas.

Symptoms.—The tumor may attain considerable size before producing symptoms. This is particularly true if it lies on either side of the vertebral bodies. The early symptoms are those due to pressure. There may be loss of appetite, nausea, vomiting, and constipation. There is a sense of pressure or weight in the abdomen. Pain may be mild or severe at times, particularly upon resisting movement of gas through the intestinal tract. Edema of the lower extremities arises from pressure upon the inferior vena cava. Constipation may result from pressure upon the intestines. A small pulse in the lower extremities may result from pressure upon the aorta or iliac arteries. The tumor may move with respiration or be slightly movable upon palpation; as a rule, however, these tumors are firmly adherent to the spinal structures and not capable of being moved. In advanced stages there are loss of weight and strength, pallor of the skin due to the secondary anemia, pain, palpable growth, and evidences of pressure.

CHAPTER VII

DISEASES OF THE BLOOD AND DUCTLESS GLANDS

Anemia

Definition.—Anemia is any deficiency in the quality or quantity of the blood. It may be a reduction in the number of red cells, in the amount of hemoglobin, or a reduction in the total amount of blood.

Etiology.—From the standpoint of cause anemias may be classified in three groups: (1) those that are due to a loss of blood; (2) those due to deficiency in the production of blood; (3) those due to an increased rate in the destruction of blood cells. A fourth type of anemia is known as local anemia; it is more properly termed ischemia and is a defect in the distribution of blood rather than a result of deficient formation, destruction, or loss. Ischemia is brought about by vasomotor spasm when temporary or by sclerotic changes and thrombosis of arteries when permanent.

Adjustment.—Adjustments of value in cases of anemia vary according to the cause. There is no specific adjustment which directly affects anemia due to loss of blood. The first essential thing to be done for such a case is to stop the hemorrhage. Transfusion may be required as an emergency measure. Adjustments which will improve body function by restoration of the flow of nerve energy will enable the body more efficiently to replace the lost blood, thereby hastening recovery.

In defective formation of blood adjustments that restore normal function of the sympathetic division of the nervous system will be highly beneficial. It is self-evident that the body be supplied with all the nutritive elements required for the production of blood.

In anemias caused by destruction of blood it is essential that the destructive agent be eliminated. This agent is frequently toxemia originating in other disease processes. Adjustments

would have to be directed toward the elimination of the primary condition. In ischemia of vasomotor origin the adjustment should be made locally in the zone of the ischemia.

Symptoms.—The symptoms due to anemia caused by loss of blood are hemorrhage, weakness, tendency toward syncope, and air hunger. The mouth is usually dry, and the patient may be nauseated and vomit. The pulse is small in size, rapid in rate, and of low tension. The skin is cool and pale and becomes moist as the symptoms of shock supervene. The blood pressure may remain normal at the onset, but after marked loss of blood it drops below 90 which is recognized as critical in cases of hemorrhage. When the hemorrhage has been stopped and transfusions administered, two or more months may be required to complete recovery.

Anemias due to diminished blood formation include pernicious anemia, aplastic anemia, splenic anemia, idiopathic anemia, and several secondary anemias. These secondary anemias include those caused by: (1) injury of the bone marrow due to destructive rays; (2) deficiency of blood building elements including vitamins and minerals; (3) poisons introduced into the body or toxins which develop as a result of disease process; (4) impairment of the function of bone marrow by disease, as arteriosclerosis, leukemia, or Hodgkin's disease.

The symptoms of these anemias are somewhat variable; but in all instances exhaustion, shortness of breath, a feeling of faintness, and vertigo are present. In most cases there is pallor. Because of the anemia the blood vessel walls may undergo fatty degeneration and dilate; when this process involves cutaneous vessels, the skin may be flushed. This process also explains the symptomatic purpura or ecchymosis which develops. When the anemia is profound, the characteristic hemic murmur may be audible at the base of the heart; this murmur is systolic in time, is not transmitted, and is not associated with enlargement of the heart. There may be intervals when it cannot be detected; after blood transfusion it disappears.

Vit B12 contain crystals of cobalt bi-sulfate

give raw liver B-12

In pernicious anemia there is little or no loss of weight; in many instances the patient has increased weight. There is a marked tendency toward edema, particularly in the lower extremities. The sclera of the eye is pearly white. The pinna of the ear has a waxy appearance and is transparent. The mucous membranes are pale. Loss of appetite and slow digestion are always marked; this is due to a marked reduction or complete absence of hydrochloric acid. The blood cells are greatly reduced, and the hemoglobin may be relatively increased. The blood coagulates slowly and imperfectly. The white cells may remain normal in number. The red cells vary in size and shape and may be nucleated or non-nucleated. The nucleated cells are known as blasts and the prefixes micro-, normo-, and macro- indicate their relative size. The non-nucleated cells are known as cytes and the prefixes micro-, normo-, and macro- indicate variation in size. Poikilocytes are irregular shaped cells which are in the process of disintegration.

The term hypochromic anemia is applied to those cases having deficiency of hemoglobin. A common form is known as chlorosis, a disease occurring in girls about puberty. It is associated with amenorrhea. The red cells may be normal in number, but the hemoglobin is reduced as low as 20%. Amenorrhea is usually present, but occasionally menorrhagia may occur. The skin is pale and waxy in appearance, but there is no edema. Emaciation is by no means constant but in rare cases it is extreme. Heart action and respiration are rapid; the extremities are cold; and the appetite is delicate: many cases crave the least nourishing foods while some manifest pica.

Anemia which results from destruction of the red cells includes those due to chemical poisons, infectious diseases which may bring about toxemia, and diseases that are responsible for the cachectic states. Among these the degree of anemia may be slight or severe. The red cells are always reducd and

vary greatly as to type. There are usually some nucleated red cells and invariably macrocytes. When the anemia is slight, the symptoms consist of diminished endurance and fatigue. As the anemia becomes more pronounced, there are acceleration of the heart and respiration rate, faintness, vertigo, coldness, and numbness in the extremities. Superimposed upon these symptoms are those of the primary disease which may be a cause of the anemia.

Leukemia

Definition.—Leukemia is a disease of the blood forming tissues characterized by a great increase in the white corpuscles with enlargement of the spleen and the lymphatic glands or bone marrow.

Adjustment.—Since the blood forming tissues are innervated by the sympathetic division of the vegetative nervous system, the indicated adjustments are in the dorsal area of the spine. Inspection, palpation, nerve tracing, and X-ray study are of assistance in determining the location of nerve interference.

Pathology.—There are three forms of leukemia: splenomedullary form which is also called myelogenous; the lymphatic form; and the acute form, which has many variations.

In the **myelogenous** form the blood is pale, and there is a great increase in the leukocytes. The total volume of blood may be increased, and the specific gravity is reduced to 1.040. The spleen is greatly enlarged, dense, and firm; this results from hyperplasia of the lymphoid tissue and the development of extensive adhesions around the spleen. The marrow in the long bones is homogenous and gray in color. The increase in white cells is due to the presence of myelocytes and myeloblasts. These cells may block the capillaries and in addition be found in large numbers outside the capillary walls.

In **chronic lymphatic leukemia** there is enlargement of the lymphatic glands in all parts of the body. The enlargement is

painless and gradual. The enlarged subcutaneous glands are palpable and visible; at first they are discrete but may coalesce and become firmly matted beneath the skin. The spleen is enlarged and palpable. The liver and kidneys sometimes undergo enlargement and contain collections of lymphocytes. No lymphoid tissue seems to escape hyperplasia in this disease, the tonsils, solitary glands, and Peyer's patches all being affected. The white cell count is high, varying from forty or fifty thousand per cubic millimeter in the early stages to two hundred thousand or more in advanced stages. All leukocytes are decreased with the exception of the lymphocytes; in many acute cases the myelocytes entirely disappear.

Acute leukemia may be myelogenous or lymphatic in form. The principal difference is in the type of white cell predominating in the blood stream. The increase in white cells and the enlargement of the spleen and lymph nodes are rapid. There is a moderate or high fever, and the duration varies from two weeks to two months.

Symptoms.—Myelogenous leukemia—the onset is gradual with discomfort in the upper part of the abdomen; this is due to enlargement of the spleen which is readily palpable. The notch at the hilus is directed toward the median line of the body, and the area of splenic dullness is increased. There is pallor of the skin, weakness, loss of weight, impairment of the appetite, and indigestion. Early in the disease the temperature varies between 99 and 100, but in the terminal stages there may be high fever. Fatigue and breathlessness are due in part to anemia and in part to the pressure exerted upon the under surface of the diaphragm. At times there may be hemorrhages from the nose and mouth or into the skin. Occasionally vision is impaired. Headr oises and vertigo are common in advanced cases. There may be ascites, a result of local congestion or leukemic infiltration. The urine often contains albumin and casts. Spontaneous hemorrhages produce purpura in the skin and paralysis when occurring in the brain, spinal cord, or large nerve trunks. The condition is usually

recognized by a blood count, which is indicated by pallor and enlargement of the spleen. The hemoglobin is reduced to fifty per cent or less, and the red cells may be proportionately reduced in number. On the other hand the white cell count may be several hundred thousand. A marked reduction in the number of blood platelets suggests danger from spontaneous hemorrhage.

Chronic lymphatic leukemia—this disease may date from a severe cold or a self-diagnosed attack of influenza. Enlarged lymph nodes in the cervical area, or as low as the axilla, may be visible or palpable. In other cases the enlarged glands may be discovered by accident inasmuch as subjective symptoms may be absent. In due time the cervical, axillary, and inguinal lymph glands enlarge in the above order. This should suggest X-ray of the chest for the purpose of determining the presence of enlarged mediastinal glands. When enlarged, they are readily detected by a hemispherical opacity which appears to cap the base of the heart. The spleen and liver enlarge and both become readily palpable. The urine contains albumin and casts. There may be slight fever from the onset. After prolonged rest, the fever may disappear for weeks or months but usually reappears upon extended activity. In advanced stages there is emaciation, weakness, loss of appetite, feeble pulse, rapid respiration, and impaired digestion. Enlarged lymph nodes with fever and weakness suggests a blood examination which is helpful in establishing the nature of the ailment.

Acute leukemia—there are many variations in acute leukemia. Most cases begin suddenly following an acute illness or prevalent infection. The fever varies from 101 to 102 degrees in the early stages and 102 to 104 in the advanced stages. The cutaneous pallor progressively increases. There is marked tendency toward capillary hemorrhage in the mucous membranes and beneath the skin. Examination of the blood is suggested by the above symptoms and assists in determining the presence of leukemia.

Hodgkin's Disease

Definition.—Hodgkin's disease is also known as **pseudoleukemia.** It is a malignant disease of long duration characterized by hyperplasia of the lymphoid tissues and is associated with a terminal anemia.

Adjustment.—Spinal correction should be made wherever needed. Nerve interference in the dorsal area impairs nature's defense mechanism, the sympathetic division of the vegetative nervous system.

Pathology.—The lymphatic nodes in all portions of the body become enlarged. The triangle formed by the neck and shoulder may be well filled. Enlargements in the mesenteric lymphatics may produce large palpable masses which exert pressure upon adjacent organs and vessels. The spleen is enlarged in the vast majority of cases; sometimes it attains a weight of 96 ounces. The enlarged cervical glands may displace the trachea, esophagus, and the large blood vessels. The enlarged abdominal lymphatics may obstruct the bile duct or produce pressure upon the intestines or branches of the inferior vena cava.

Symptoms.—The onset is very gradual. The patient observes that he has been less active than formerly and becomes exhausted after slight exertion. The cervical glands are the first to enlarge, then the axillary and inguinal. Later glands of the abdomen and mediastinum become enlarged and produce their pressure symptoms. The temperature is above 99 degrees but recedes to the normal level after rest. Both the red and white cells are normal in number in the early stages; as the disease progresses there is a secondary anemia which reduces the red cells. The white cells remain near normal, varying from seven to fifteen thousand per cubic millimeter. Dyspnea results from pressure upon the trachea and larynx, dysphagia from pressure upon the esophagus, and aphonia from pressure upon the recurrent laryngeal nerve. Localized edema may result in any part of the body where superficial

veins become subject to the pressure of the glandular enlargements. Itching of the skin is present in most cases. Patches of pigment producing chloasma often develop in advanced cases. Most cases travel a very chronic course. At times there are remissions with apparent improvement and gain in weight; frequently there are recurrent attacks of fever during which recent gains are completely lost. The duration of the disease varies from two to seven or eight years. In the later stages there are marked emaciation, cachexia, and fever.

Purpura Hemorrhagica

Definition.—Purpura hemorrhagica is also known as **thrombocytopenia.** It is a condition characterized by hemorrhages into the skin and mucous membranes. It is due to a marked reduction in the number of blood platelets, usually to one hundred thousand or less.

Adjustment.—In the main, dorsal adjustments are indicated in hemorrhagic purpura; but since many cases date from illnesses as mild as the common cold, the cervical and lumbar areas of the spine should not be overlooked. It is important to normalize the function of the nervous system.

Pathology.—The blood platelets are developed from the megakaryocytes of bone marrow; therefore, conditions which tend to destroy or impair the function of these marrow cells are responsible for the thrombocytopenia. Such conditions may be brought about from benzol poisoning, bacterial toxins, exposure to X-rays, and the disease leukemia which causes gross changes in the bone marrow. It is thought by some that thrombocytopenia is directly related to leukemia.

Bleeding occurs from mucous membranes and into the skin. The blood platelet count varies between one-third and one-tenth of normal. The bleeding time is increased; also a clot is fragile and does not retract. Secondary anemia may result from extensive loss of blood.

Symptoms.—Most cases date from a minor illness such as coryza, measles, sore throat, or moderate dysmenorrhea. The first symptom is bleeding from the mucous membranes, particularly the upper frenum labiorum. The bleeding may occur simultaneously at other points; if during the menstrual period, uterine hemorrhages may become extensive and dangerous. A few petechiæ may be scattered over the body. The slightest trauma may lead to the large ecchymosis. The body temperature attains 99 degrees or higher at least once each day; this is particularly true of the acute cases. Recovery may be complete in a few weeks or months. In some cases the disease follows an intermittent course, there being several recurrences. The spleen is somewhat enlarged, and there is a moderate anemia in the majority of cases. Extensive hemorrhages produce marked anemia. There are exhaustion, shortness of breath, and sighing from the resulting anoxia.

The chronic form of purpura is not related to the acute form. Most patients complain of bruising easily. They have intermittent attacks of petechia and ecchymosis. The hemorrhages are usually small and the patient is but rarely incapacitated. Examination of the blood will show reductions in the number of platelets at the times of hemorrhages. Most cases tend to have menorrhagia at which time the blood platelet count reaches its lowest level.

These patients should have adequate supply of fresh fruits and fresh vegetables, particularly those rich in vitamin K. Prolonged rest in bed should be mandatory in all acute cases.

Symptomatic purpura is sometimes called simple purpura. It is not a disease, nor is it dependent upon alteration in the number of blood platelets. The condition may result from dilated capillaries, embolism, or the mechanical causes capable of producing venous obstruction. In febrile diseases it is, no doubt, caused by toxemia. Simple purpura is prone to develop in severe cases of measles, scarlatina, and typhoid wherein the macules become petechial. It is not uncommon around the

joints in rheumatism and arthritis. In dengue and spinal meningitis it may occur without the presence of other cutaneous eruptions.

Purpura neonatorum occurs in the newborn. It may be caused by congenital syphilis. Hemorrhages may be in the mucous membranes and beneath the skin. When occurring in the urinary tract, it produces hematuria; from the lungs or bronchi it produces hemoptysis; and from the stomach it produces hematemesis.

In syphilitic cases the child may appear healthy at birth. Hemorrhages from the mucous membranes or the internal organs may occur in a few days. A truthful history of the parents or serological tests may be required to establish the disease. In non-syphilitic cases the bleeding begins in from one to three weeks. It is of brief duration, and the majority of cases recover.

Hemophilia or Bleeders disease.

Definition.—Hemophilia is a hereditary disease of the male in which coagulation is retarded. Extensive bleeding may result from trivial injuries and continue for days. While the disease occurs only in males, it is transmitted only by the females.

Adjustment.—Upper cervical; upper, middle, and lower dorsal adjustments are indicated in hemophilia.

Pathology.—The clotting time of the blood is thirty to forty minutes. The blood cells and platelets are normal in number and appearance. There is a deficiency of the fibrin-forming ferment which enables coagulation to occur.

Symptoms.—Uncontrollable bleeding is the outstanding symptom. Most cases are related to trauma, even though the injury be slight. The hemorrhages may occur from a bruised surface, a lacerated membrane, or into a contused joint. These hemorrhages may occur for hours or days and in due time produce anemia. One of the peculiar features is that hem-

orrhage does not result from a pin prick, but a trival scratch of the skin may result in severe hemorrhage.

Hemophilia differs from purpura in that purpura affects either sex and is rarely congenital, while hemophilia is always congenital and appears in males only. In hemophilia blood platelets are present but the blood does not normally coagulate; in purpura the blood platelets are deficient and cause the clot to be imperfect.

Scurvy

Definition.—Scurvy is a nutritional disorder caused by deficiency of vitamin C which is characterized by sponginess of the gums and a tendency to hemorrhage.

Adjustment.—Middle and lower dorsal adjustments are indicated.

Pathology.—Cutaneous hemorrhage is found in both the infantile and adult forms. This hemorrhage is an oozing from distended capillaries and not a result of their rupture. Hemorrhages may involve deep structures including the viscera. The gums are swollen and spongy in appearance. Blood oozes from them upon slight pressure. Anemia is present in advanced cases.

Symptoms.—Infantile form—when young children are handled, they cry as if in severe pain; this is marked when the legs are moved. Inspection of the lower extremities will reveal petechia and ecchymosis. There is also a subperiosteal hemorrhage in the tibia; this causes an observable swelling on the front of the shin. The overlying skin is tense and bulging, and this swelling is extremely tender upon palpation. Spontaneous fractures are apt to occur between the epiphyses and diaphysis of the long bones in the legs. The child usually lies without moving in a state of pseudoparalysis. Deformities of the thorax are common, especially those occurring at the junction of the rib with its costal cartilage. The eyeballs frequently protrude and subconjunctival hemorrhages may be ob-

served upon close inspection. These cases recover promptly when permitted to obtain fresh fruits and vegetables.

In the adult form weakness, loss of flesh, pallor of the skin, and cutaneous hemorrhages are among the earliest symptoms. The teeth become loose, the gums bleed, the breath has a foul odor, the tongue is coated, and the appetite is impaired. The skin is dry, rough, and scaly. The ecchymoses appear as small hemorrhages upon the extremities and large ones upon the trunk. The joints are frequently affected and impair walking. The face and lower extremities tend to become edematous. The urine is scant and highly colored and may contain blood, albumin, and casts. The temperature increases with the toxemia and may attain 102 degrees. All symptoms promptly subside when the patient obtains the needed elements ordinarily found in fresh fruits.

Addison's Disease

Definition.—Addison's disease results from destruction of the adrenal glands. It is characterized by asthenia, depressed circulation, irritability of the stomach, and pigmentation of the skin. It is known as **suprarenal cachexia** and the **bronzed skin disease.**

Adjustment.—The adrenal glands are supplied exclusively by the lower dorsal sympathetic nerves which are related to them embryologically. The adjustment indicated in Addison's disease is 10th, 11th or 12th dorsal.

Pathology.—The most common pathologic process which destroys the cortex of the adrenal gland is tuberculosis in which there are both fibrous and caseous changes. There are numerous tubercles and necrotic masses surrounded by fibrous tissue. Non-tubercular portions of the gland tend to undergo atrophy because of restricted nutrition due to contraction of the fibrous tissue.

Symptoms.—The first symptom of Addison's disease is as-

addisons disease - always [illegible]

T. tumors.
N. necrosis.
T. tuberculosis.
(95% of cases caused by T.B.)

thenia. This consists of a sense of weakness which progressively increases and is accompanied by anorexia, indigestion, dyspena, attacks of palpitation of the heart, and excessive drowsiness. The muscular weakness is due to the lack of function of the adrenal glands. The absence of cortin tends to produce dehydration and failure of the circulatory system. The blood pressure is reduced far below normal, and cardiac edema develops in the lower extremities.

Pigmentation of the skin is its first symptom to attract attention of friends. At first the skin has a dirty appearance or a yellowish tint. In time it becomes dark brown or bronzed. The mucous membranes are similarly affected, and there may be patches or leukoderma or leukoplakia. The cutaneous discoloration is most evident on the face and hands which are subject to the exposure of the sun's rays.

The digestive disturbances exist throughout the duration of the disease. They consist of anorexia, nausea, vomiting, and diarrhea. There is epigastric discomfort and frequently abdominal distention. Pain is not an outstanding symptom, but many patients complain of intermittent backache in the lower dorsal area of the spine. The disease progressively follows a chronic course, varying from a few months to ten or more years.

Splenic Anemia

Definition.—Splenic anemia is also known as Banti's syndrome and Banti's disease. It is a condition of anemia associated with enlargement of the spleen and atrophic cirrhosis of the liver.

Adjustment.—Adjustments are indicated in the middle and lower dorsal areas of the spine. The middle dorsal area supplies the liver, the portal sheath, and the spleen.

Pathology.—The spleen undergoes hyperplasia and secondary degeneration. Hemorrhages may occur into the spleen, and in due time the lymphoid tissue diminishes. The liver at first enlarges and becomes firm; later it becomes hard and di-

minishes in size. There may be slight jaundice, diminished red cells, and leukopenia. In the terminal stages portal obstruction occurs producing ascites.

Symptoms.—The disease affects young adults between twenty and forty years of age. The onset is insidious with the reduction in the red cells causing weakness, breathlessness, and fatigue. The upper abdomen becomes distended; the spleen may be palpable in the left hypochondrium. There may be purpuric spots and areas of chloasma. Digestive disturbances are always present. There may be gastro-intestinal hemorrhages and often hemorrhoids. These are, no doubt, a result of obstruction to portal circulation. The advanced stage of the disease is indicated by the development of ascites; the anemia becomes more profound, and jaundice may appear. There may be alternating remissions and exacerbations. The disease follows a chronic course of several years.

Simple Goiter

Definition.—Simple goiter is an enlargement of the thyroid gland without any disturbance in its function. The two most common forms of simple goiter are colloid and adenomatous.

Adjustment.—Adjustments are indicated in the lower cervical or upper dorsal area. In those cases which develop at or near puberty and may be related to gonadal disturbances, the adjustments should include the lumbar area of the spine.

Pathology.—In colloid goiter the thyroid gland is uniformly enlarged and has a smooth surface. The acini of the gland are filled with colloidal material. In an earlier stage the gland may be hyperemic and is often referred to as a vascular goiter; this, however, appears to be the beginning of a colloid goiter. Adenomas may develop as small nodules that produce visible and palpable elevations upon the otherwise smooth surface.

Adenomatous goiter is a tumor of the thyroid. The tumor is usually nodular causing the gland to be lumpy and uneven.

There is hyperplasia of the epithelial and fibrous tissues. Adenomas vary in size from small elevations barely palpable to enormous nodular formations. Adenomas may remain normal in function or may become overactive, producing hyperthyroidism, in which case it becomes a toxic goiter.

Symptoms.—Simple goiter may be unilateral or bilateral, and the enlargement may be diffuse or circumscribed. When circumscribed it may affect the isthmus or either the right or left lobes. When diffuse both lobes and the isthmus are enlarged. The symptoms are those created by pressure such as dyspena from pressure upon the trachea, dysphagia from pressure upon the esophagus, and aphonia from pressure upon the inferior laryngeal nerve. Aphonia is most common when the enlargement affects the inferior poles and the bulk of the enlargement is situated behind the sternum. A small portion of the thyroid gland is sufficient to provide the body with needed thyroid secretion; consequently, in diffuse goiter where parts of the gland atrophy due to pressure from enlarged portions, the gland continues to function in a normal manner. As long as this is true the basal metabolism rate remains normal and the patient enjoys good health. Simple goiters are usually removed for appearance reasons or because they produce pressure.

Exophthalmic Goiter

Definition.—Exophthalmic goiter is an enlargement of the thyroid gland characterized by hypersecretion, increased basal metabolism, and protrusion of the eyeballs. It is also known as **Graves' disease, Parry's disease,** and **Basedow's disease.** Women are more frequently affected than men.

Adjustment.—It is important to establish functional balance between the sympathetic and parasympathetic divisions of the nervous system. Adjustments are indicated in the upper cervical, lower cervical or upper dorsal, and lower dorsal areas of the spine.

Pathology.—There is a dilatation of the blood vessels in the thyroid gland; this causes a degree of stasis and edema. There is also hyperplasia of the epithelial cells which is not always uniform nor extensive. In some cases the thyroid is but slightly enlarged; in others it is large and nodular.

Symptoms.—Circulatory symptoms are the first to appear. They consist of tachycardia with attacks of palpitation. The pulse rate is invariably above 100, but during the rapid paroxysms it may attain a rate of 200 to 250. There is visible pulsation of the vessels in the neck and the patient experiences head noises as a result of the forcible heart action. There is an increasing sense of fatigue and excitability. Even though the appetite may be excellent, there is loss of weight. The surface of the body usually feels warm, and the patient perspires profusely. The production of body heat is increased by the high metabolism rate. Perspiration is an adaptation in an attempt to normalize the body temperature.

The exophthalmos is readily recognized upon inspection. There is inability to rotate the eyeballs in following a moving object. The lids may not completely cover the eyeball when the eyes are closed. The protrusion of the eyeball is caused by motor reflex expressed in the Müllerian muscle, after which there is excessive deposit of fat in the orbital cavity. A fine tremor observable in the hands is a cardinal symptom. It is best detected when both hands are extended. A sheet of bond paper placed on the back of the hands will vibrate at the rate of the tremor. The systolic blood pressure may be elevated to 150 mm. causing a high pulse pressure. There is often a change in disposition: the patient is irritable, displays a loss of temper, and may become emotional. Occasionally there are attacks of vomiting and diarrhea; these are always accompanied by a loss of weight. When the appetite is good and the patient eats sufficient food to maintain combustion, the loss of weight will be slight. When the appetite fails or should the patient enter upon a fast, there is rapid loss of weight due to

oxidation of surplus fat. Patients with exophthalmic goiter should have physical and mental rest and adequate supply of food. Most cases respond readily to adjustments and proper care.

Myxedema

Definition.—Myxedema is a condition arising because of absence or atrophy of the thyroid gland. The disease is so named because of a myxedematous condition of the subcutaneous tissues.

Adjustment.—Upper and lower cervical and lower dorsal areas of the spine are indicated for adjustments.

Pathology.—Myxedema results from complete removal of the thyroid gland, or when it is encountered in practice, the cause may be atrophy or degeneration of the gland. In cases of congenital absence of the thyroid, the condition is known as **cretinism.**

Symptoms.—Myxedema is six times as common in women as in men. It usually begins with mental dullness and puffiness in the upper eyelids, brow, and extremities. Occasionally there are joint pains on walking and use of the arms. The patient develops a characteristic full-moon face in which the features are coarse: the lips become thick, the nose broad and negroid. Patients who previously have been alert and active become slow in thought and movement. Their incapacities cause them to worry. In walking they frequently stumble. The basal metabolism rate is low, the skin is usually dry and harsh; the hair becomes thin and brittle. The swollen tissues do not pit upon pressure because the apparent edema is due to accumulated fat and mucin. Most cases follow a chronic course but live comfortably under the administration of thyroxin.

Cretinism—This is a condition resulting from complete absence of thyroid secretion. The thyroid may be entirely absent or it may have undergone degenerative change before birth.

At birth the child may appear normal, but during the early

months of life it will be observed that body development is impaired. The fontanels fail to ossify. The teeth appear late and are deformed when erupting. The nose is broad and flat. The tongue is excessively large and often protrudes from the mouth. The eyes are far apart. There is a complete lack of intelligence in the facial expression. Epiphyseal cartilages fail to ossify, and as a consequence the extremities become deformed. Many cretins learn to walk, but their gait is imperfect. They have a typical potbellied abdomen with pads of fat upon the buttocks. The skin of the face develops transverse wrinkles giving to the child a peculiar grin. The abdominal fat may develop in folds between which there are transverse wrinkles. The mental development rarely exceeds that of imbecility.

Acromegaly

Definition.—Acromegaly is a condition of enlargement of bones and soft tissue of the head, hands, and feet, resulting from hyperpituitarism that occurs after the epiphyses of long bones have been ossified. The condition is also termed Marie's disease. It is believed to be related to gigantism which is hyperpituitarism occurring before ossification of the epiphyses.

Adjustment.—Upper cervical and upper dorsal regions should be adjusted.

Pathology.—That type of hyperpituitarism causing both gigantism and acromegaly results from an adenoma of the pituitary gland. The difference between these two conditions is that gigantism occurs before the eighteenth or twentieth year and is an abnormal or excessive growth; on the other hand, acromegaly follows the age of twenty and is an enlargement and disproportion of the body with slowing of the mental processes.

Symptoms.—The onset is slow and gradual, usually between the twentieth and thirtieth year of life. Dryness and harshness are characteristic of the skin, patches of leukoderma often adding to the disfigurement. As the fingers enlarge, a

deformity, known as the "spade hand" becomes evident; this deformity is caused by bony "tufts" which form upon the distal phalanges. The facial expression becomes decidedly masculine, the facial changes being due to enlargement of the bones and expansion of the subcutaneous tissues of the face, especially thickening of the tongue, lips, and nose. Although the entire head has enlarged, the changes are most noticeable through the superciliary regions and in the mandible. In the latter the enlargement promotes a disrelationship of the teeth, making mastication difficult. The voice may be altered. A dorsal kyphosis with a barrel chest gives the patient a distinctive posture. The muscles which appear large fatigue readily, explaining the weakness; while dull headaches in the frontal and temporal region add to the discomfort. In some cases there is profuse perspiration with bromhidrosis, and the patient commonly complains of paresthesias. Intellectual alertness is diminished in the majority of cases, and the patient often fails to comprehend matters pertaining to time and distance. The disease may cease to progress at any stage and does not materially shorten the life expectancy unless intracranial pressure develops. The intracranial complications frequently are a cause of death.

SECTION III—CHAPTER VIII

EXAMINATION OF THE RESPIRATORY ORGANS

By DR. H. E. VEDDER

The Thorax

The Sternum.—The sternum is approximately six inches long. It lies in the median line of the anterior thoracic wall affording attachment to the clavicles and the costal cartilages. The upper border is marked by a depression (the episternal

notch) which lies at the level of the disk between the second and third dorsal vertebræ. This notch is normally two inches anterior to the disk. The lower terminus is marked by a depression (scrobiculus cordis) commonly called the pit of the stomach. This lower terminus lies at the level of the disk between the ninth and tenth dorsal vertebræ. At the junction between the manubrium and the gladiolus a transverse ridge is readily palpated. This is the angle of Louis (Ludovici) and marks the junction of the second costal cartilage with the lateral border. **This is a convenient starting place in counting the ribs.**

Ribs and Intercostal Spaces.—There are twelve ribs and eleven intercostal spaces. The space is designated by the same number as the rib above it. The first rib in front is on the level of the fourth rib behind. The second to the seventh ribs in front are on the level of the sixth to the eleventh ribs respectively at the back. Thus by adding four to the rib palpated at the anterior we determine the number of the rib at that level at the posterior. At the posterior the tips of the spinous processes on the second to the ninth dorsal vertebræ lie opposite the third to the tenth ribs respectively. Thus the tip of the sixth spinous process marks the level of the seventh rib, etc. The tips of the eleventh and twelfth spinous processes are opposite the ribs of their corresponding numbers.

Mammary Gland and Nipple.—In the female the mammary gland normally extends from the third to the seventh interspace. In the male the nipple is in the fourth intercostal space.

Scapula.—The scapula extends from the second rib to the seventh rib. Its inferior angle marks the level of the seventh dorsal spinous process. The root of the scapular spine marks the level of the third dorsal spinous process.

Lines of the Thorax

There are **nine vertical lines** which are arbitrarily designated to divide the thorax.

Midsternal Line.—Marks the median line of the sternum.

Sternal.—Marks the lateral border of the sternum.

Parasternal Line.—Lies midway between the sternal and midclavicular lines.

Midclavicular (Mammillary) Line.—Is drawn vertically downward from a point midway between the two ends of the clavicle.

Anterior Axillary Line.—Is drawn downward from the anterior axillary fold.

Midaxillary Line.—Is drawn downward from the midpoint of the axilla.

Posterior Axillary Line.—Is drawn downward from the posterior axillary fold.

Scapular Line.—Is a vertical line passing through the inferior angle of the scapula.

Midspinal Line.—Marks the line of the spinous processes.

There are **seven horizontal lines**; four at the anterior and three at the posterior. It is obvious that these cross the vertical lines at right angles and thus serve to divide the thorax into many "checkerboard" areas. It is imperative that the student become thoroughly familiar with the viscera underlying these areas. Information which is gained through routine examination is based on such knowledge. Hence the value of such information and the accuracy of the diagnosis is primarily dependent upon accurate knowledge of underlying organs.

Cricoclavicular Line.—Extends from the cricoid cartilage to the outer end of the clavicle.

Calvicular Line.—Marks the anterior border of the clavicle.

Third Chondrosternal Line.—Passes lateralward from the junction of the third costal cartilage with the sternum.

Sixth Chondrosternal Line.—Passes lateralward from the junction of the sixth costal cartilage with the sternum.

Scapulospinal Line.—Follows the scapular spine and extends from its root medianward to the midspinal line.

Angulo-Scapular Line.—A horizontal line drawn through the inferior angle of the scapula.

Twelfth Dorsal Line.—A horizontal line passing through the twelfth dorsal spine.

Areas of the Thorax

The areas of the thorax which are established by the vertical and horizontal lines, together with the viscera which underline them, must be visualized in order to make the findings of the physical examination valuable. These areas are:

Supraclavicular Area.—Lies between the cricoclavicular line and clavicular line. Underlying viscera are apexes of lungs, common carotid arteries, subclavian arteries, subclavian veins, jugular veins.

Sternal Area.—Is that area which lies behind the sternum. Underlying viscera are the lower trachea with its bifurcation, anterior border of lungs, ascending aorta, arch of aorta, superior vena cava, left innominate vein, right auricle, most of right ventricle, right borders of both left auricle and left ventricle, part of left lobe of liver.

Infraclavicular Area.—Bounded by the sternal line, clavicular line, anterior axillary line, and third chondrosternal line. Underlying viscera on right are upper lung lobe, root of lung providing extrance for right bronchus, right pulmonary artery, and right bronchial artery. Underlying viscera on left are upper lung lobe, root of lung providing entrance for left bronchus, left pulmonary artery, and left bronchial artery, major portion of the left auricle.

Mammary Area.—Bounded by the sternal line, third chondrosternal line, anterior axillary line, sixth chondrosternal line. Underlying viscera on right are parts of right auricle and ventricle, upper lobe of lung, middle lobe of lung, dome of right

lobe of liver overlaid with this edge of lung. The dome of the liver ascends to the fourth intercostal space. Underlying viscera on left are the upper and lower lobes of lung, major portion of the heart.

Hypochondriac Area.—Bounded by the sixth chondrosternal line, the costal arch, and the anterior axillary line. Underlying viscera on right are the complemental pleural space, diaphragm, and right lobe of liver. Underlying viscera on left are the cardiac end of stomach, complemental pleural space, and diaphragm.

Axillary Area.—Bounded by the apex of axilla, anterior and posterior axillary lines and sixth chondrosternal line. Underlying viscera on both sides are the lungs.

Infra-axillary Area.—Bounded by the sixth chondrosternal line, the anterior and posterior axillary line, and the costal arch. Underlying viscera on right are lower border of lung, complemental pleura, diaphragm, and right lobe of liver. Underlying viscera on left are lower border of lung, complemental pleura, diaphragm, cardiac end of stomach, and anterior end of spleen.

Suprascapular Area.—Lies above the scapular spine. Underlying viscera are the apexes of the lungs.

Scapular Area.—Bounded by the scapulospinal line, spinal border of scapula, angulo-scapular line, and the posterior axillary line. Underlying viscera on both sides are the lungs.

Interscapular Area.—Bounded by the two spinal borders of the scapulæ, the angulo-scapular line, and a horizontal line through the seventh cervical vertebra. Underlying viscera on right are the posterior edge of the lung, the right side of the trachea, the right bronchus, and the right bronchial and pulmonary arteries. Underlying viscera on left are posterior edge of the lung, the left side of the trachea, the left bronchus, the left bronchial and pulmonary arteries, the descending aorta, the esophagus, and the thoracic duct.

Infrascapular Area.—Bounded by the angulo-scapular line, the twelfth dorsal line, and the two posterior axillary lines. Underlying viscera on right are lower border of lung, complemental pleura, diaphragm, right lobe of liver, and upper portion of the right kidney. Underlying viscera on left are lower border of lung, complemental pleura, diaphragm, descending aorta, upper portion of left kidney, and the major part of the spleen.

Topography of Pulmonary Thoracic Viscera

Trachea.—The trachea or windpipe is about four and one-half inches in length and one inch in diameter. Above it is a continuation of the larynx; and below it is terminated by a bifurcation which forms the right and left bronchi, extending to the right and left lungs respectively. The upper end of the trachea is opposite the sixth cervical vertebra while the bifurcation is at the level of the fourth dorsal vertebra. At the anterior this is indicated by a point slightly above the angle of Louis.

Bronchi.—These two divisions extend outward from their origins in the trachea to enter the lungs at their roots. The right bronchus extends almost vertically downward to terminate at the level of the fifth dorsal vertebra. It is about one inch in length and is slightly greater in diameter than is the left. The left bronchus is more nearly horizontal. It is two inches in length, slightly less in diameter than is the right; and its lower terminus is opposite the sixth dorsal vertebra.

The Right Lung.—The apex of the right lung extends from one to one and three-quarters inches above the clavicle. From here the anterior border extends to the midsternal line at the level of the second rib, thence downward to the sixth chondrosternal articulation. Thus it can be seen that much of the anterior border lies behind the sternum. There, however, is a thin border overlying the contents of the right mediastinum. At the sixth chondrosternal articulation the lower border of

the lung begins. Here the border bends sharply outward and follows the sixth rib to the midclavicular line. Continuing to the right the lower border lies at the level of the eighth rib at the midaxillary line. At the posterior the lower border is at the level of the tenth rib in the scapular line and at the level of the eleventh rib at the spine. This entire lower border forms a thin edge because of the convexity of the diaphragm. The right lung has three lobes. The fissure which divides the upper and lower lobes begins at the third dorsal vertebra and extends downward, outward, and forward to cross the fourth rib at the midaxillary line. Here it bifurcates. One division follows the fourth rib and cartilage to the sternum. The other division passes downward and forward to terminate at the lower border of the lung in the midclavicular line. It is between these two latter fissures that the wedge-shaped middle lobe lies. Thus it can be seen that the surface of the middle lobe is at the lower front and side of the thorax. It is equally obvious that the upper lobe covers the greatest area in front, while the lower lobe covers the greatest area at the posterior.

The Left Lung.—The apex of the left lung extends from one to one and three-quarters inches above the clavicle. From here the anterior border extends downward and forward to a point beneath the left edge of the sternum at the angle of Louis. From here it extends downward to the level of the fourth chondrosternal articulation with its border barely under the sternum. It then curves outward, downward, and slightly inward to the level of the sixth rib. Thus it forms a superficial semicircular area under which lie the mediastinal viscera. At the sixth rib the border bends sharply outward to cross the eighth rib at the midaxillary line, the tenth rib at the scapular line, and the eleventh rib at the spine. The lower border of the left lung lies slightly lower than the lower border of the right lung.

The left lung has two lobes divided by a single fissure. This fissure begins at the level of the third dorsal vertebra, extends outward, downward, and forward across the fourth rib at the

midaxillary line, continues forward and downward to terminate at the lower border of the lung in the midclavicular line. Thus it can be seen that the surface of the upper lobe occupies the greater portion of the anterior thorax, while the surface of the lower lobe occupies the greater portion of the posterior thorax.

Because of the greater tone possessed by the lungs in early life it is found that in children the lower border of the lungs lies approximately one rib higher than indicated above, while in old age when tone is deficient it is one rib lower. For all practical purposes the student should fix in his mind that at the anterior the lower border lies at the sixth rib, at the sides at the level of the eighth rib, and at the posterior at the level of the tenth rib.

The Pleuræ.—Each lung is surrounded by a closed pleural sac which does not communicate with the pleural sac of the opposite side. The pleura consists of two layers, between which is a potential cavity containing sufficient serum that they may readily glide upon one another. The outer division of the pleura (parietal layer) is closely attached to the inner wall of the thorax, the diaphragm, and the mediastinal viscera. At the root of the lung it is reflected upon itself to form the visceral layer. The visceral layer closely invests the surface of the lung. Because there is a potential vacuum between these two layers the lungs are held continually "on the stretch." The attachment of the diaphragm to the trunk wall is at a lower level than the border of the lungs. Hence a complemental space lies between the diaphragm and the thoracic wall into which the borders of the lungs are sucked when the diaphragm contracts and flattens. The extent to which this complemental space extends below the lower border of the lung varies. At the anterior it is about two inches lower; at the sides about three and one-half inches lower, while at the posterior it is about one and one-half inches lower. Thus it can be seen that when the diaphragm is relaxed a part of the parietal layer covering the diaphragm is in contact with the

lower border of the parietal layer lining the thorax. It is only upon deep inspiration that these two surfaces are drawn apart, and at that time the lower borders of the lungs descend to fill that space.

Physiology of Respiration

The lungs may be considered as honeycomb organs, the minute divisions of which are known as the air sacs or alveoli. These air sacs may be compared to the grapes arranged in a single huge bunch. We may consider the main stem of the bunch as the bronchus and all the subdivisons leading to the grapes as the smaller bronchial divisions. It is through the walls of the air sacs that the interchange of carbon dioxine for oxygen occurs. The carbon dioxinde is in the blood contained in minute capillaries on the outside walls of these air sacs. The oxygen is inside the air sacs. It is obvious that in order for the blood to be constantly renewed with oxygen and in order for the carbon dioxide to be carried away from the air sacs that there must be a constant exchange between the air in the lungs and the external.

The potential vacuum between the parietal and visceral layers of the pleura produces constant traction on the lungs and forces them to conform to the contour of the thoracic wall. Thus when this thoracic wall changes its position, the lungs must follow. The thorax is enlarged during the act of inspiration by the contraction of the diaphragm together with the contraction of those muscles which serve to elevate the ribs. The elevation of the ribs increases the lateral diameter and the anteroposterior diameter of the thorax while the contraction and flattening of the diaphragm increases the vertical diameter. Thus the size of the thorax is increased, producing an increase in the size of the lungs. This increase in the size of the lungs tends to decrease its air pressure, and air passes in through the respiratory passages in consequence.

In quiet expiration no muscular contraction occurs. The muscles which have produced inspiration merely relax, giving an opportunity for the natural elasticity of the lungs to ex-

press itself. This elasticity pulls up the diaphragm, pulls down the ribs, and squeezes the air out.

Nervous Mechanism.—The respiratory center which lies in the medulla is divided physiologically into an inspiratory center and an expiratory center. The expiratory center is brought into use only in case of forced expiration and then for the purpose of producing contraction in the abdominal muscles to hasten expiration. The responsiveness of this center is determined by the amount of carbon dioxide contained in the blood. This carbon dioxide acts as a hormone; and when it is present in abundance, the respiratory center is highly responsive. When the carbon dioxide, however, is deficient, the responsiveness is proportionately decreased. The chief afferent nerves of respiration are the vagi. These nerves respond when the lungs have reached a certain degree of collapse, and the result is motor impulses sent to the diaphragm and other respiratory muscles. Toward the end of inspiration, when a certain degree of expansion has occurred in the lungs, the vagi again respond; and the result is inhibition. The principal efferent nerves are the phrenic nerves which supply the diaphragm with motor impulses in response to the demands made through the vagi. It is obvious that injury to either the phrenic or the vagus on one side will lead to paralysis of the diaphragm on that side, while injury to the nerves on both sides will lead to complete paralysis of the diaphragm and almost complete suspension of breathing. It is equally obvious that injury to the respiratory center in the medulla leads to cessation of breathing.

Inspection and Palpation of the Thorax

It is essential that three methods of investigation be employed, and the examiner is urged to not make the error of depending upon any one channel of investigation. Inspection and palpation constitute one method. Percussion constitutes the second method, and ausculation constitutes the third.

Each is a verification of the other two, and by combining the findings of all the greatest accuracy can be attained.

Preparation and Method.—The chest of the patient should be bared in order to achieve the best results through inspection. The investigator should inspect the front of the chest, the back of the chest, and the sides of the chest, comparing the two sides in all cases. In this work it is necessary that a good light be upon the surface under inspection. Finally, and perhaps most important, the chest should be inspected from above. In doing so the examiner sees, as it were, a cross section, is able to compare depth on the two sides, and is able to detect minor enlargements or depressions in the surface which might otherwise escape his notice.

Normal Chest.—The normal chest should be visualized as a cone-shaped cage, the base of the cage being downward and the apex being marked by the first ribs. The shoulders formed by the clavicle and scapula should not be considered in visualizing the shape of this bony cage which encloses the thoracic viscera. Normally the right side of the chest is slightly larger in right-handed individuals, and ofttimes a very slight right curvature of the spine is noted. The prominence of the clavicle has no great significance unless very marked depressions are observed above it and below it. There is normally a slight depression below the outer half of the clavicle which is known as Mohrenheim's fossa. The costal arches ascending and converging unite at the lower end of the sternum to form the infrasternal angle or "pit of the stomach." This angle is normally from seventy to eighty degrees.

Measuring the Chest.—An ordinary linen tape is all that is necessary to make such measurement. If a steel tape is used, care should be taken to see that the sharp edges do not cut the flesh. The measurement should always be made at the level of the nipples, and extreme care must be exercised to see that the tape passes around in a horizontal line. The size of the chest varies greatly but is normally about five inches

greater in men than in women. Normal expansion during forced respiration is from two to five inches. Deficient expansion is greater cause for concern than excessive expansion. The relation between the anterposterior and the lateral diameters of the chest is as three to four.

Deformities of the Thorax

Deformities of the thorax may be congenital; they may result from spinal curvature, constitutional disease, or occupation. In children, unless the deformity is congenital or rachitic, it is usually associated with obstruction in the upper air passages, more especially from adenoids. In the adult deformity is most often associated with pathology in the thoracic viscera. It is obvious that deformity may be either unilateral or bilateral and that the character of deformity is a very important factor in determining the pathology which is responsible.

Bilateral Deformity

Pterygoid or Phthisical Chest.—The characteristics of this form of chest are: shallow from before backward; flat and often concave anteriorly; very prominent clavicles with deep fossæ above and below; drooping shoulders; long neck; very prominent scapulæ; head inclined forward; acute angle of ribs both at the back and in front, thus forming an acute infrasternal angle; emaciation; and often a loss of both tone and size of the muscles investing the thorax. It is significant of chronic phthisis when well marked. When less pronounced it is significant of a phthisical diathesis or of an arrested case.

Emphysematous (barrel) Chest.—The characteristics of this form of chest are: elevated ribs giving the short, broad shape; large infrasternal angle; anteroposterior diameter equal to or greater than lateral diameter; shoulders elevated and "square"; head tilted slightly back; large intercostal spaces; greatest enlargement in middle and upper chest;

kyphosis in upper dorsal region. It is characteristic of hypertrophic pulmonary emphysema.

Rachitic Chest.—The characteristics of this form of chest are: increased anteroposterior diameter; decreased lateral diameter; abnormal forward prominence of the sternum due to the soft, flat ribs being drawn inward at the sides of the thorax; very acute infrasternal angle; nodular enlargements at the junction of the ribs with the costal cartilages. This series of enlargements is parallel to the sternum, and is known as the "rachitic rosary." Harrison's sulcus is a depression from the ensiform cartilage, downward and outward, marking the attachment of the diaphragm. It is pronounced by the inward pull of the diaphragm on the soft thoracic wall. The rachitic chest is not significant of pulmonary disease.

Pigeon (keel) Chest.—The characteristics of this form of chest are: an acute bending of the ribs at the angle with a consequent straightening of the anterior ends of the ribs. This results in a prominent sternum, limited room in the anterior thorax, and upon cross section a triangular shape of the chest. It is commonly found in cases of rickets associated with obstruction in the upper air passages.

Funnel Chest.—This type of chest is characterized by a funnel-shaped depression of the lower end of the sternum, projecting into the chest transversely. The depression sometimes extends as high as the third rib. It is usually congenital or occupational and is not significant of pulmonary disease. Like the rachitic and pigeon chest, however, it decreases the total size of the thorax and by limiting the activity and expansion of the lungs predisposes to pulmonary disease.

Unilateral and Local Deformity

Unilateral Enlargement is characterized by a more horizontal position of the ribs, wider intercostal spaces, increased semicircumference and anteroposterior measurements on the enlarged side, raised shoulder on the enlarged side, scoliosis

with convexity toward the enlarged side. Such enlargement may be primary or compensatory. If primary it is due to increased size of the lung or to accumulation of gas, serum, blood, or pus either in the lungs or pleura. If in the pleura the enlargement is toward the base of the lungs, and the intercostal spaces usually bulge slightly. If the enlargement is compensatory to decreased expansion in the opposite lung, the enlargement is rendered even more pronounced by comparison with the opposite contracted side.

Local Prominence on the front or side of the thorax is due to an abnormal chest wall or to enlargement of one or more of the internal viscera. It may be due to a malformation of one or more ribs, perhaps from previous fracture. It may be due to a tumor in the thoracic wall. Either of these two conditions is readily detected by palpation. Localized serofibrinous pleurisy leads to local prominence; also neoplasm of lungs or pleura, a fluid-filled cavity in the lungs, pericardial effusion, and enlargement of the heart. Protrusion of the sternum may be due to aneurysm of the aorta and rarely to malignant disease of the underlying lymphatics. Protrusion in the left hypochondrium is indicative of splenic enlargement; on the right side to enlargement of the liver. Marked and acute scoliosis or kyphosis is indicative of spondylitis.

Unilateral Contraction is characterized by decrease in anteroposterior diameter, increased lateral diameter, and decreased circumference. The shoulder on the affected side droops; and a spinal scoliosis, with the concavity toward the affected side, develops. The ribs present a more acute angle, and the intercostal spaces are narrowed. This condition indicates that the lung on the involved side is given less room for expansion, and in consequence a compensatory emphysema develops on the opposite side. Unilateral contraction most often indicates chronic pulmonary tuberculosis. Other causes are fibrosis of interstitial pneumonia, fibroid phthisis, or extensive adhesions of the pleura which practically obliterate the pleural cavity.

Local Depression immediately above and below the clavicle is chiefly indicative of apical pulmonary phthisis. Next in importance it is significant of fibrosis. Ulcerative phthisis with resultant cavity may also cause such depression. In addition localized adhesions, fractured ribs, and pulmonary abscess may be causes. If on the posterior wall, abscess is most often indicated; on the lateral wall, adhesions.

Respiration

Frequency of Respiration.—The examiner should note the frequency of the respiration without making the patient aware of it. Should the patient know that his respiratory rate is being observed, he may alter it without conscious volition. The rate of respiration at birth is 44 per minute. At the fifth year it is 26 per minute and in the adult approximately 18 per minute. It is well to note here that in the adult the rate of the pulse to respiration is 4 to 1.

Rapid respiration may or may not be associated with dysponœa. Physiologically the respiratory center is super-responsive under all forms of mental stress. Thus anger, joy, or excitement are all associated with increase in the respiratory rate. Muscular exertion, because it produces a larger quantity of carbon dioxide, also increases respiration. These factors should be considered in any conclusions based on respiratory rate. An extremely rapid respiration is often associated with hysteria. Any pathological condition which decreases the aerating surface leads to rapid respiration.

Abnormally slow respiration indicates a physical condition in which the respiratory center has been impaired and is only slowly responsive. This is the condition which prevails in poisoning from chloroform, opium, and other drugs. It is also found in various forms of coma and in collapse.

Types of Respiration.—There are two types of respiration —thoracic and abdominal. The thoracic type is normally present in women. In this type thoracic movement predom-

inates. The abdominal type is usually present in men and children, and in this type the abdominal movement predominates.

If the thoracic type is excessive, it indicates nonactivity of the diaphragm for some cause. Abdominal tumors, ascites, or gas in the abdomen are factors which limit the action of the diaphragm and result in thoracic breathing. This is also true of peritonitis, appendicitis, or abdominal abscess. Inflammation of the diaphragmatic pleura leads to thoracic breathing. Large pericardial or pleural effusions may by virtue of additional weight on the diaphragm limit its mobility. Paralysis of the diaphragm, either unilateral or bilateral, has a like effect. It is also to be observed that excessive thoracic breathing is often associated with hysteria.

Excessive abdominal breathing indicates that some condition exists to limit the mobility of the thorax. This is found in a case of hypertrophic emphysema. It is also present in calcification of the costal cartilages and in paralysis of the thoracic respiratory muscles. Pleurisy involving the upper parts of the lung or fractured ribs which have led to pleural inflammation are causative factors.

Degree of Respiration.—Noting the degree of expansion is important in that it discloses with some degree of accuracy whether or not sufficient air is entering the lungs. Inspection from the front, sides, back, and above should give a fairly accurate judgment regarding the comparative expansion on the two sides. Inspection should be supplemented by palpation. It should be observed whether there is excessive or diminished expansion in any area. For the greatest accuracy in this connection the tape measure should be employed. One should be careful to see that the tape is horizontally placed and at the level of the nipples. In men the expansion in forced respiration should be at least two inches and in women two and one-half inches. If a spirometer is used to measure the quantity of air which can be exhaled after the greatest inspiration, it should not fall below a given amount, which

amount differs in men and women. In men the normal amount is 3½ times the height in inches. In women the amount is 2.3 times the height in inches. Therefore, in a man six feet tall the respiratory capacity should be 72 x 3½ or 252 inches.

Deficient expansion may be bilateral or unilateral. If the degree of general expansion is materially decreased, pulmonary tuberculosis should be first suspected. This is particularly true if the general expansion falls below two inches. Other conditions which are indicated by decreased general expansion are pleurisy, pneumonia, intercostal neuralgia, angina pectoris, or pleural pain due either to inflammation or a fractured rib. Paralysis of the respiratory muscles, the bronchial constriction associated with asthma, and emphysema are also causative factors. Obstruction of the trachea from any cause or a decrease in the size in the larynx offers mechanical interference to inhalation and thus leads to decreased expansion. Finally, extreme weakness may be a causative factor in poor general expansion.

Unilateral and local deficiency is caused by fluid or air in the pleura, extensive adhesions of the pleura, obstruction of one or more bronchi, pathological changes of tuberculosis which render part of the lung functionless. If the deficient expansion is on the right side, it may be due to an enlarged liver. If the deficient expansion is at the apex of the lung and is especially marked by depression above and below the clavicle, phthisis should always be suspected. It should not be forgotten, however, that pneumonia with the consequent consolidation may render a part or all of one lung functionless. In most of the above mentioned conditions the associated symptoms will serve to exclude some and point more clearly to others.

Increased expansion occurs following exertion, during hysteria, in some forms of dyspnea. If the increased expansion is unilateral or local, it is usually compensatory to decreased expansion in other lung regions.

Respiratory Bulging and Retraction.—Bulging or retraction in the intercostal spaces should not be confused with emaciation or an especially well-developed thorax.

Retraction occurs only during inspiration. If it is bilateral it is indicative of laryngeal obstruction or double pneumonia. If it is localized, it is indicative of obstruction of a bronchus, pleural adhesions, or pulmonary collapse which sometimes occurs in infants. The reason that retraction occurs in these conditions during inspiration is that the lungs are unable to follow the rapid expansion of the thorax.

Bulging occurs as a rule during the expiratory act and is usually associated with bronchial obstruction. This condition is well shown in the expiratory dyspnœa of asthma. It is usual that retraction and bulging occur alternately during the act of inspiration and expiration respectively. The only condition wherein bulging occurs during inspiration is in the case of emphysema where the apexes of the lungs are chronically enlarged and protrude above the clavicles.

Respiratory Rhythm.—Respiration normally occurs at the rate of fourteen to eighteen per minute. Inspiration is slightly shorter than expiration, the ratio being five to six. Normally there is a slight pause at the end of the expiration. It should be noted that respiration is somewhat irregular in children while awake or during restless sleep, and this condition in these cases has no important diagnostic significance.

Sighing is a form of irregularity in rhythm which occurs in certain diseases. It is indicative of an overabundance of carbon dioxide in the blood. It is commonly found during periods of emotional stress, hysteria, or melancholia. An overdistended stomach by limiting the movement of the diaphragm may bring about a condition of excess carbon dioxide and consequent sighing. Meningitis, lesions of the medulla, the typhoid state, heart diseases, hemorrhage, collapse or syncope —all disclose this irregular respiration. Finally it should be remembered that sighing occasionally occurs in persons who

are entirely normal but whose physical inactivity leads to shallow respiration and improper oxygenation.

Simple irregularity in breathing is associated with collapse, apoplexy, meningitis, lesions of the medulla, or other conditions which affect the respiratory center. A pause at the end of inspiration is found in acute pneumonia.

Cheyne-Stokes breathing is a type of breathing where the respiratory act is entirely suspended for perhaps thirty seconds. This is followed by rapid breathing which is gradually increased until an apex of deep, rapid breathing is reached. This is followed by gradual decrease until a period of apnea again occurs. These cycles from apnea to apnea occupy from thirty seconds to two minutes. This condition may persist for hours or days and in very rare cases for weeks. It is a symptom of extreme gravity and usually presages a fatal termination. It really indicates a beginning of failure of the respiratory center. This condition is associated with heart diseases, apoplexy, chronic nephritis, meningitis, brain tumor, embolism, diabetes, typhoid fever, pneumonia, pertussis, scarlet fever, and all forms of profound septic conditions.

Jerky respiration is usually found where thoracic breathing predominates. If found during inspiration it is usually associated with asthma, hysteria, pleurisy, and fractured ribs. If found during expiration it is associated with pleurodynia, adhesions, or a fractured rib.

Stertorous breathing (snoring) is often a normal condition during sleep. It is found also when the patient is unconscious from apoplexy, uremic poisoning, narcotic poisoning, and diabetes. If present during sleep it leads to a suspicion of adenoids or enlarged tonsils.

Stridulous respiration usually occurs during the act of inspiration and results from a constriction of the larynx. It is described as a whistling, screeching, or harsh sound. It may be due to obstruction of the larynx or paralysis of the abduc-

tor muscles. It is also due to inflammation, edema, or tumor of the larynx; to the presence of a foreign body; or to spasmodic croup, laryngismus stridulous, strychnine poisoning, or tetanus. It may also occur from pressure on the inferior laryngeal nerve; and this in turn may result from tumor, aneurysm, or enlargement of the bronchial glands.

Dyspnea.—Labored breathing is called dyspnea. It is characterized by greater frequency in the respiratory rate and by the apparent employment of the muscles used in forced respiration. In extreme dyspnea there is cyanosis. The dyspnea may be inspiratory or expiratory or both.

The clinical picture of dyspnea is more or less familiar to all. The expression is anxious, the pupils dilated, the nostrils distended, and the mouth open. The thorax, abdomen, or both heave. Often there is cold perspiration, the muscles of the neck contract, and the shoulders are elevated. To accomplish this latter the patient often rests the weight on the hands or places the arms over the back of a chair or a window sill.

Primarily the condition is due to the inability to obtain the proper oxygen supply for the needs of the body. In extreme muscular exertion much oxygen is used, and large quantities of carbon dioxide are thrown into the blood stream. Temporary dyspnea may appear under such a condition even when there is no evidence at other times of any difficulty.

It is evident that an obstruction in any part of the air passages may result in dyspnea. The obstruction may be in the nasal cavities, the pharynx, the larynx, the trachea, or the bronchial tubes. Reason will readily suggest some of the more common obstructions. These include enlarged turbinates, adenoids, enlarged tonsils, laryngeal abscess, aortic aneurysm, mediastinal tumor, etc. It is equally evident in pulmonary disease which decreases the surface of the lungs. In this connection it is also necessary to include those conditions of the pleura which limit lung mobility; also cardiac dis-

eases which result in pulmonary stasis; and finally those diseases of the blood which reduce its oxygen-carrying capacity. The most common causes are debility, anemia, cardiac or renal disease, and pulmonary insufficiency. It is obvious, therefore, that examination should be made of the heart, lungs, air passages, urine, and blood.

Dysponea on exertion (but not constantly present) indicates obesity, anemia, debility, partially compensated valvular lesions, myocarditis, bronchitis, emphysema, pleural effusion, and early tuberculosis.

Constant dyspnea may indicate anemia, marked debility, valvular lesions with lost compensation, laryngeal stenosis, bronchopneumonia, lobar pneumonia, fibrinous bronchitis, phthisis, large pleural effusion, arterial hypertension from diabetic acidosis.

Paroxysmal dyspnea indicates acute indigestion, bronchial asthma, spasmodic croup, chronic nephritis, cardiac disease, or pressure on the vagus nerve from any cause.

Inspiratory dyspnea is associated with intercostal depression during the inspiratory act. It may result from a foreign body or tumor in the larynx above the vocal cords. Paralysis of the abductors, spasm of the abductors, edema and inflammation of the larynx are all causative factors.

Expiratory dyspnea may be evidenced by bulging at the intercostal spaces during the expiratory act. Most often it indicates pulmonary emphysema or bronchial asthma. The inspiration is short and gasping while the expiration is long and wheezing. This form of dyspnea in rare cases indicates a polypoid growth below the vocal cords.

Fremitus

Vibration of the thoracic wall which is detected by the sense of touch is called fremitus. Vocal fremitus results from vibration from the vocal cords. Bronchial fremitus results from vibration in the bronchial tubes. Pleural fremitus results from friction in the pleura. Succussion fremitus results from fluid and air in the pleural cavity.

Fremitus is detected by placing the palms of the hands or the tips of the fingers on the thorax. To detect fremitus at the apexes the index finger should be laid flat immediately above the clavicle.

Vocal Fremitus

In order to make practical use of the various degrees of fremitus one must understand how the vibration of the thoracic wall is produced. If the examiner has this knowledge and a clear mental picture of the structures contained in the thoracic cavity, his findings become a matter of reason and thus far transcend in importance that information which is acquired through memory and without understanding.

During phonation the vibrations of the column of air in the larynx travel outward from that organ in all directions. This is readily demonstrated by placing the fingers on the throat of one who is speaking and sensing there the vibrations which have traveled from the larynx to the surface. These vibrations will be readily detected because of the proximity of this surface to their origin.

The column of air below the larynx also vibrates, and these vibrations are transmitted downward through the treachea and the right and left bronchi to the terminal bronchioles and pulmonary alveoli. From the pulmonary alveoli underlying the pleura these vibrations pass through the pleura and through the thoracic wall to the surface. They are, of course, modified and decreased in intensity the farther they travel from their source.

It should be recalled that the lungs are elastic organs, and the ease with which vocal fremitus is detected depends upon their tone as well as the proximity of the air to the surface. Practice will readily demonstrate these vibrations over all parts of the thoracic surface. The deep bass voice produces slower vibrations which are more readily detected than those of a higher pitch. Thus in men vocal fremitus is more readily detected. It will also be found that the intensity of the fremi-

tus depends upon the volume of the tone. If the patient speaks in a loud voice, the fremitus is very apparent, while graded decreases in the volume decreases the fremitus until in whispering it cannot be detected at all.

For these reasons the patient should be instructed to repeat the words "ninety-nine" over and over again while the fremitus is being tested. He should also be instructed to use a constant pitch and a constant volume.

In general it may be said that the fremitus is most easily detected at the anterior of the thorax somewhat less palpable at the sides, and least palpable at the back. It will also be found that the fremitus on the right side, particularly in the region over the right bronchus, is more clearly felt than that over the left bronchus. The reason lies in the larger column of air in the larger right bronchus. The nature of the thoracic wall must be taken into account. In thin, emaciated individuals the fremitus is normally most easily detected; whereas if the thorax is overlaid with muscle and fat, it is more difficult to detect.

Practice in detecting vocal fremitus will enable the examiner to determine definitely the lower border of the lungs. As the hands are moved downward to the region over the liver, the fremitus abruptly ceases.

Abnormal Vocal Fremitus.—If one keeps in mind the reason for the production of vocal fremitus, he has a sound basis upon which to establish the cause of increased or decreased vocal fremitus. If the vocal fremitus is increased, there must be a better conductor than in the normal lung. If the vocal fremitus is decreased, it results from a poorer conducting material.

In the main it may be stated that an increased vocal fremitus indicates an abnormal condition of the lung tissue, whereas decreased vocal fremitus is significant of pleural involvement. There are, however, certain exceptions to this general rule which will be pointed out in the following paragraphs.

Vocal fremitus is increased in all forms of consolidation where the consolidation lies close to the surface of the thorax and extends inward to a communication with the air column. A consolidation of the lower lobe of the lung yields increased vocal fremitus if the lower branches of the bronchus are open. If, however, these lower branches should for any reason become occluded, then the column of air from the larynx will be shut off from communication with the consolidated area; and fremitus will be decreased or absent.

Pulmonary diseases with consolidation which usually produce increased fremitus are pneumonia, phthisis, hemorrhagias, infarction, neoplasm, atelectasis due to external pressure, connective tissue induration, etc. Lung cavities which communicate with a large bronchus are excellent conductors and greatly increase the vocal fremitus. This is also true of consolidations which reach the larger bronchial tubes. Large pleural effusions which greatly compress the lung also increase vocal fremitus because the fluid and compressed lung act as one solid body filling a greater or lesser space in the thorax. If a more limited pleural effusion develops, the fremitus is decreased in the lower part of the lung immediately under which the fluid lies but is increased above this line due to the compression of the lung tissue. Bronchiectasis is the only bronchial affection which discloses an increased vocal fremitus. Pleural adhesions are also the cause of increased fremitus in some cases.

Diminished vocal fremitus results chiefly from two causes. These are stenosis or occlusion of the bronchi and the presence of gas or fluid between the layers of the pleura.

Obstruction of the bronchi may result from several causes. It may be produced by tenacious accumulations, by the presence of foreign bodies, by aneurysm, by pericardial effusion, and by the development of cicatricial tissue in the wall. Partial stenosis leads to decreased fremitus while complete obstruction leads to entire absence of fremitus. The area over which the vocal fremitus is decreased or absent is, of course,

determined by the extent to which the lung is supplied by the tubes involved. Pneumothorax, hydrothorax, hemothorax, and pyothorax are all conditions which separate the two layers of the pleura and decrease its conducting ability. Thus the vocal fremitus is deadened or entirely obliterated.

Rhonchal Fremitus—or bronchial fremitus—is due to vibrations in the bronchi. Mucous, pus, blood, and serum are all substances which when accumulated in the bronchial tubes may vibrate to produce rhonchal fremitus. Thus it can be seen that fremitus of this character has a variable diagnostic significance. The rhonchal fremitus which is palpated over the upper sternal area, the lower part of the infraclavicular area, and the upper part of the mammary area is usually not of grave significance, but most often indicates inflammation in the larger bronchial tubes. On the other hand, rhonchal fremitus in the upper part of the infraclavicular area and in the supraclavicular area is significant of phthisis and is of grave diagnostic import.

Rhonchal fremitus should not be confused with pleural fremitus. The latter is usually attended with pain, which pain is increased on pressure in the intercostal spaces. Pleural fremitus is not affected by coughing, whereas rhonchial fremitus often is.

Pleural Fremitus is the fremitus which results from the friction between the two layers of the pleura. It is present in acute fibrinous pleurisy and also in the early stages of serofibrinous pleurisy. This type of fremitus is of a peculiar grating character and is accompanied by pain. Both the fremitus and the pain are increased upon pressure in the intercostal spaces over the area involved.

Succussion Fremitus.—This type of fremitus results from the splashing of fluid contained in the pleural cavity against the thoracic wall. It is only found in those cases where sufficient air is contained in the pleura to allow free movement of the fluid.

Percussion

The Principle of Percussion.—Everyone is familiar with the method employed to locate a studding in a frame wall. By tapping on the wall a certain degree of resonance is detected which is least directly over the studding while it is greatest between adjacent studdings. The reason is that in the one case the wall vibrates less than in the other. This principle is employed in percussion on the human body. If a portion of the body is struck with a sharp staccato stroke, a certain sound is elicited. The character of this sound depends upon the character of the tissues underlying the surface struck. If the sound produced vibrates with some definite regularity as is the case over the lungs, it is said to be resonant or clear. Somewhat the same character of sound may be elicited by sharply tapping bony structures. If, however, we percuss a soft, thick muscle, the sound produced is flat or dull. Here there is not the same character of regular resonant vibrations. In the main it may be said that organs containing air vibrate with a characteristic resonance, yet this resonance is modified by the structure of the organ and the amount of air contained. Percussion over the stomach yields a drum-like note classed as tympanic. Percussion over the lungs produces an entirely different character of resonance with which the examiner becomes familar through practice. In brief, the purpose of percussion is to determine the character of the tissues below the surface struck. Familiarization with the normal percussion note enables one to detect the abnormal notes and thus determine pathological change which may have developed.

Although percussion detects the amount of air below the surface, another important purpose is to outline the borders of organs. The percussion note over the liver is dulled, whereas the percussion note over the lungs is resonant. Thus the examiner determines the exact location of the lung border.

The Application of Percussion.—In the practice of percussion a small rubber-tipped hammer may be employed as the

plexor or striker. A hard rubber or metal tube may be placed on the surface of the body to intervene between the surface and the plexor. This intervening structure is known as the pleximeter. Usually, however, the examiner finds it convenient to use the fingers of one hand as pleximeters and one or more fingers of the other hand as plexors.

Sometimes it is desirable to strike the surface of the body directly with the plexor. This type of percussion is known as direct or immediate percussion. When, however, a pleximeter is employed, it is known as indirect or mediate percussion. Indirect percussion is most commonly employed.

The pleximeter finger should be held flat against the surface under examination and with a reasonable degree of firmness. By doing so the vibratory tone of the surface under examination is more readily detected. The examiner should assume a position that is as comfortable as possible both to himself and the patient. Care should be taken to see that the pleximeter finger is in contact throughout its entire length and does not arch away from the surface. The plexor finger may be any of the fingers of the opposite hand although the index or middle finger is most commonly employed. This is a matter of personal choice. This plexor finger should be bent so that the last two phalanges are approximately at right angles to the proximal phalanx. The most convenient place to strike the pleximeter finger is at the root of the nail. The pleximeter should be struck squarely, care being taken to avoid striking a glancing blow. Care should also be taken to see that the direction of the stroke is perpendicular to the surface under examination. The percussion stroke is a staccato stroke being given from the wrist. The beginner must avoid the error of employing a stroke that is too strong and of using the entire forearm. Two or three strokes in one area are all which should be employed. To strike repeatedly only serves to "tire the ear" and destroy one's accuracy of judgment.

Interpreting the Percussion Sound.—In interpreting the sound those factors which are to be studied are the pitch, vol-

ume, duration, and character. If the air under the surface is extensive; the pitch is low, the volume is great, the duration is extended, and the character is one of great resonance or tympany. If the contained air is small in quantity or absent; the pitch is high, the volume small, the duration short, and the character flat. At one end of the sound scale may be placed the tympanic variety. This variety is extremely resonant or drum-like. At the other end of the scale may be designated the flat sound which is similar to the sound elicited by tapping a piece of putty. Between these two extremes is the normal resonant sound. It is, of course, necessary that the examiner familiarize himself with the normal character of the percussion notes which are found in various areas of the body.

It is, of course, evident that the amount of muscle or fat overlying the air-containing viscera will modify the percussion sounds; and this should always be taken into account in any judgment of them.

The strength of the percussion stroke should be modified to meet the requirements. In the case of an extremely heavy thoracic wall it wall be necessary to increase the strength of the stroke in order to elicit lung-sounds. As a general rule it may be said that the percussion sound is the vibratory response of the tissue to which the percussion stroke penetrates. Thus, if one is demonstrating deep consolidation of the lung, it is necessary that the stroke be strong. If one is demonstrating a superficial consolidation, the stroke should be light. Beginners usually err in using a percussion stroke that is too strong. The fine shades of sound are lost through this error.

In outlining organs a light percussion stroke should be used. This is readily demonstrated by percussion downward over the lower lobe of the right lung. In approaching the lower margin of the lung where it overlies the liver, a light percussion stroke elicits normal lung resonance; but a powerful stroke penetrates this thin edge of the lung and gives a note of liver dullness. Likewise, percussion downward over the right lobe of the liver toward its thin edge discloses the liver

dullness only by using a light stroke. If a heavy stroke is used, the thin edge of the liver is penetrated and abdominal tympany is heard.

Palpatory percussion is a variety of percussion where the plexor finger or fingers are permitted to remain on the surface after the percussion stroke has been delivered. This form of percussion may be either direct or indirect, and its purpose is to gain information regarding the underlying structures both through the sense of hearing and the sense of touch. It is particularly useful in detecting consolidations and accumulations of fluid.

Auscultatory percussion is especially useful in outlining organs. The stethoscope is placed approximately over the center of the organ, and the examiner percusses from the stethoscope outward in straight lines and in various directions. It is observed that when the border of the organ is reached the character of the sound heard through the stethoscope is modified. By marking the points where such modification takes place in all directions, an accurate outline of the organ can be made.

Percussion of the Lungs

Percussion of the lungs is for two purposes: first, to determine the lung boundaries and, second, to determine whether more or less than the normal amount of air lies under the surface percussed.

It is preferable for the patient to assume the upright posture without turning the head. If the patient is confined to bed and the upright posture is not practical, he should be gently turned from side to side to expose all surfaces being examined. If in the upright posture the patient should be sitting in an easy comfortable position with the arms hanging freely at the sides when percussion of the anterior thorax is made. When the sides of the thorax are being percussed, the hands should be clasped above the patient's head. When the

posterior thorax is being percussed the patient should lean slightly forward with the arms folded on the chest or the elbows brought close together.

The examiner should take care to percuss both sides of the thorax in order to obtain a comparison.

Routine examination should be made by first percussing both apexes. Next, the examiner should percuss downward in the midclavicular line on both sides taking into account the modification from the liver at the lower border of the right lung and the modification of the heart and stomach toward the lower part of the left lung.

Percussion should then be made in the midaxillary line from above downward, recognizing the liver dullness toward the lower border of the lung on the right side. The examiner should also recognize the tympanic modification from the stomach and the dull modification from the spleen toward the lower border of the left lung.

At the back percussion should be made from above downward over the scapular lines on both sides. Toward the lower border on the right side normal resonance will be modified by the liver, while on the left side it will be modified by the spleen and left kidney.

Normal Percussion Sounds.—In the supraclavicular area there is moderate pulmonary resonance except toward the trachea, where it becomes tympanic. In the infraclavicular spaces there is typical pulmonary resonance with a tendency toward the tympanic quality over the large bronchial tubes. This tympanic quality is slightly more pronounced on the right than on the left because of the larger right bronchus. In the mammary spaces the pulmonary resonance is somewhat decreased, due to the mammary glands and pectoral muscles. In these areas, too, the sounds are modified toward the lower border of the right lung by the liver and over the precordial area on the left side by the heart. In the axillary spaces typical pulmonary resonance is heard, modified by the liver

on the right side and by the stomach and spleen on the left side. The infrascapular spaces are less resonant than the infraclavicular spaces, but they are the most resonant of any of the posterior areas. The suprascapular spaces possess modified pulmonary resonance. The scapular areas overlaid by the scapulæ and heavy muscular structures are the least resonant of any lung areas.

Alteration in Position of Lung Borders.—It is evident that any abnormal condition which increases the expansion of the lungs correspondingly extends the lung borders. It is equally true that any abnormality which limits pulmonary expansion retracts the lung borders. This variation may be detected through percussion. A general increase of expansion and the consequent extension of lung borders is characteristic of hypertrophic emphysema. A decrease of expansion causes retraction of the lung border as may be discovered in bronchial congestion and pneumonia.

Increased resonance at the apexes is present in bronchial asthma and whooping cough. Decreased resonance at the apexes is characteristic of phthisis, bronchial obstruction, pneumonia at the apex, and adhesions of the pleura.

Extended resonance of the anterior borders is present in hypertrophic emphysema and during bronchial asthma. Often the extension of the anterior border of one lung is due to the compensatory increase of that lung. Decreased resonance at the anterior border may result from cardiac hypertrophy, pericardial effusion, pleural effusion, fibroid phthisis, intestinal pneumonia.

Extension of the lower border is associated with hypertrophic emphysema and occasionally from pericardial effusion, which depresses the diaphragm. It should be remembered that the lower borders of the lungs lie approximately one inch lower in old age than in adult life. It is equally important to remember that in childhood the lower border is approximately one inch higher than in adult life. Further, if the patient is

in the horizontal position, the lower border of the lung lies one inch lower because of the tendency of the heavy abdominal viscera to depress the diaphragm and to pull the lungs down into the complementary space.

Decreased resonance at the lower border indicates chronic interstitial pneumonia, fibroid phthisis, paralysis of the diaphragm, abdominal tumor, or subphrenic abscess. Pleural effusion also leads to a raising of the lower border of the lung.

Decreased Resonance.—It is obvious that since normal pulmonary resonance results from a normal amount of air under the surface percussed, a decreased resonance indicates that there is less than the normal amount of air. The diagnostic significance is, therefore, variable. Some of the conditions which are indicated by this decrease of resonance are the consolidation of pneumonia, fibroid phthisis, abscess, tumor, pleural thickening, infarcation, atelectasis, hydrothorax, and hemothorax. Because of the variety of conditions which decreased resonance indicates, it is desirable to consider such decreased resonance in respect to its position in the lungs.

Decreased resonance at the apexes is primarily indicative of phthisis, although one should not lose sight of the possibility of apical pneumonia, tumor, or atelectasis.

Decreased resonance of the lower lobes suggests pneumonia, pleural effusion, atelectasis, infarction, neoplasms, or abscess.

Pleural effusion is usually first observed between the sixth and tenth ribs at the back. The degree of dullness varies with the size of the effusion. When large, there is not only absolute dullness but visible bulging of the intercostal space.

Extensive fibroid changes associated with chronic interstitial pneumonia and fibroid phthisis will give rise to a characteristic "wooden" percussion note.

Dullness in the left interscapular area may be significant of aortic aneurysm. Dullness in both interscapular areas is significant of bronchial pneumonia, hypostatic pneumonia, or passive congestion of the lungs.

Dullness at the base of the lungs which changes readily as the patient changes posture is characteristic of hydropneumothorax.

Increased Resonance.—In the main it may be said that increased resonance is significant of an increase in the amount of air under the surface percussed. Thus the resonance is increased in hypertrophic emphysema. There is also an increased resonance over lung cavities which changes to dullness if the cavities fill with fluid. Increased resonance is also significant of pneumothorax. A superficial consolidation directly over a large bronchial tube or a superficial cavity causes increased resonance. The superficial consolidation serves to increase the thickness of the chest wall. The hyperresonance obtained is tympanic in character and arises from the area in the cavity.

When the lung is greatly compressed by a pleural effusion, percussion over the apex of the lung above the effusion gives rise to tympanic resonance. This is called skodiac resonance, being named after the first observer of this phenomenon.

A strongly resonant note is found in hypertrophic emphysema. This may be unilateral or bilateral. If it is unilateral, it is compensatory.

Hyperresonance in the upper lung associated with dullness at the bases is significant of pleural effusion, basal penumonia, pulmonary edema. Hyperresonance in the infraclavicular region near the sternum, which is associated with dullness at the apexes, is significant of consolidation from the surface to the trachea or bronchi.

Cavities in the lung produce a localized tympany. It may be caused by tuberculosis, abscesses, gangrene, and bronchiectasis.

Amphoric (metallic) resonance is tympanic in quality but higher in pitch and greater in duration than is the usual form of tympany. It is indicative of a reasonably large, smooth-walled cavity in the lung or of pneumothorax.

The cracked-pot sound is tympanic in character but possesses an overtone of a rather hissing quality. It is best noted with the patient's mouth open and during expiration. It is the result of air passing from a cavity into the bronchial tubes. When it is observed at the apexes, it is significant of a lung cavity communicating with a large bronchus. If it is at the base of the lung, it usually indicates pneumothorax with a communicating opening into the bronchi or to the external. This type of percussion note is best observed under strong percussion.

Coin percussion is used to detect pneumothorax. If a stethoscope is placed on the thoracic wall over the suspected area, and if two coins are employed over another part of the same area, one placed flat on the chest and the other used as a striker; the sound will be dull and flat if pneumothorax is not present. If pneumothorax is present, the sound will be heard as a faraway tinkle.

Auscultation

There are three important channels of investigation through auscultation of the lungs. The first of these is to determine the character of the breath sounds. The second is to determine the character of the voice sounds; and the third is to discover adventitious sounds, which include rales, succussion sounds, and friction sounds.

Before the ausculation is begun, the patient should be disrobed sufficiently to permit the placing of the stethoscope directly on the skin over the areas to be examined. The intervention of clothing is at all times to be avoided, particularly in lung examinations. It is sometimes difficult to detect slight shades of difference in the sounds, and the judgment should not be made more difficult by the friction of intervening clothing. It is desirable that the patient be in the upright position; but if this is impractical, the examiner must make the best of the situation. The patient should be instructed to breathe regularly and deeply, as some varieties of abnormal sounds are heard only upon deep respiration.

Normal Breath Sounds

An understanding of the significance of breath sounds is obtained through a knowledge of their production. As the air passes through the comparatively narrow opening between the vocal cords, it is set in vibration. This vibration is not sufficient in ordinary breathing to produce sound which can be readily heard. By placing the stethoscope directly over the larynx, however, it is easily detected. It is the passage of this air through the larynx and the consequent vibration of the column of air in the trachea and bronchial tubes which is the source of the breath sounds.

There are three varieties of normal breath sounds. They are the bronchial, vesicular, and bronchovesicular.

Bronchial Breathing.—Bronchial breathing is normally heard in the region immediately over the trachea and larger bronchial tubes. It is heard at the anterior from the larynx downward to the upper half of the manubrium. At the posterior it is heard as far down as the lowest cervical vertebra. This sound is heard throughout inspiration and expiration with a slight pause immediately before the completion of the inspiratory act. These inspiratory and expiratory sounds are of approximately the same length, the sound of inspiration being slightly shorter in the ratio of five to six. This sound is usually described as being of a blowing or tubular character, and it is readily heard in the locations designated because of the proximity of the trachea and large bronchi to the surface. Practical experience with normal patients is the only way one can become familiar with the characteristics of this bronchial sound.

Vesicular Breathing.—The vesicular breath sound is so named from the fact that it is heard in those portions of the chest directly over the pulmonary vesicles. It is a much softer, more breezy sound than is the bronchial sound. It is often described as being comparable to a gentle rustling of leaves in a gentle breeze. This sound is heard throughout all

of inspiration but is heard only during one-third of expiration. Laënnec, the originator of the stethoscope, describes and explains vesicular breathing as follows: "One hears during inspiration and expiration a soft murmur, but extremely distinct, which indicates the penetration of the air into the pulmonary tissue and its expulsion." Thus, the vesicular vibrations arise from the friction of the air against the walls of the small bronchioles and the air cells.

Bronchovesicular Breathing.—There is no hard and fast line where the change is suddenly made from bronchial breathing to vesicular breathing. There is a limited area of possibly one inch in width at the sides of the sternum and the spine where the character of the sound partakes of both the bronchial and vesicular qualities. At the anterior this extends down to the angle of Louis, while at the posterior it extends to the fourth dorsal vertebra. It is here that the large bronchi are overlayed with a thin edge of lung vesicles and thus the bronchial sound must be transmitted through this thin, spongy, vesicular tissue. It is for this reason that the sound is neither typically bronchial nor typically vesicular but is a combination of both.

Abnormal Breath Sounds

Intelligent understanding and interpretation of abnormal breath sounds requires familiarity with the normal sounds. Abnormal breath sounds are established when bronchial or bronchovesicular breathing is heard where vesicular breathing should exist and in those cases where vesicular breathing is absent, decreased, or increased. The significance of these sounds should become a matter of reason, the basis for the reasoning being a knowledge of lung structure and a knowledge of what causes normal breath sounds.

Bronchial Breathing.—When bronchial breathing is found over an area where vesicular breathing should prevail it signifies that some condition exists which more perfectly trans-

mits the breath sounds from the trachea and large bronchi to the surface. The most common cause of such breathing is consolidation which extends from the surface to a large bronchial tube, and the region over which the bronchial breathing is heard determines the extent of the consolidation. If this consolidation extends into the large bronchi, it is of low pitch; while if it extends into small bronchi, it is of high pitch. If bronchial breathing is found at the apex of the lung, it is usually significant of tuberculosis. It may, however, indicate apical pneumonia, gangrene, abscess, adhesions, infarctions, tumor. If this type of breathing is found at the base of the lung, it is most often significant of pneumonia or fibroid phthisis.

Large pleural effusions sufficiently extensive to compress the lung and make it a potential solid body around the bronchi give rise to "distant" bronchial breathing.

Amphoric breathing is significant of a superficial cavity opening into a reasonably large bronchial tube or a pneumothorax opening into a large bronchial tube. This type of breathing has a peculiar musical note and is comparable to the sounds made when blowing across the large neck of a bottle.

Sudden cessation of bronchial breathing where it has been present is due to a plugging of a bronchial tube.

Vesicular Breathing.—Vesicular breathing in old age is normally decreased. This is due to the loss of tone in the lung tissue and its decreased ability to transmit vibrations. If the vesicular breathing in adults or children is decreased, it may be due to an excessively thick chest wall, thickened pleura, small pleural effusion, emphysema, obstructed bronchus.

Increased vesicular breathing is normal in infants and early childhood. It is undoubtedly due to the greater tone which the lung tissue possesses at this age. Care should be taken to avoid confusing an increased vesicular sound with a bronchial or bronchovesicular sound. The distinction can be made by noting the time ratios. Even in an increased vesicular

sound the ratio of inspiration and expiration is three to one. In adults, if the vesicular breath sound is increased, it is significant of increased respiratory effort. If found over one lung only, it is compensatory to deficient expansion in the other lung. If heard over both lungs, it is significant of dyspnea.

Normal Voice Sounds

Vocal resonance is detected through the use of the stethoscope over various regions of the thorax. The voice sounds are conducted from the larynx downward through the air columns of the trachea and bronchial tubes to the air vesicles and thence to the surface through the thoracic wall. When the patient is asked to count or repeat "ninety-nine," the sound as heard through the stethoscope has a characteristic buzzing quality and is not clearly articulate. The farther the stethoscope is placed from the trachea the less distinct is this vocal resonance. The use of the stethoscope to determine the voice sounds is for the purpose of determining the carrying ability of the structures between the larynx and the surface where the stethoscope is placed.

Decreased Vocal Resonance.—This condition is significant of a plugged bronchus, pleural effusion, pneumothorax, or thickened pleura.

Increased Vocal Resonance.—This condition indicates some form of consolidation between the surface where it is detected and a large bronchial tube. These conditions include fibroid phthisis, pneumonia, tumor, abscess, gangrene, infarction. Increased resonance may result from a cavity close under the surface communicating with a large bronchus.

If the spoken word becomes articulate, it signifies **pectoriloquy.** This is a condition wherein the transmitting medium conveys the vocal sounds to the surface with a marked degree of perfection. Whispering pectoriloquy is a condition wherein the whispered word can be distinguished. This indicates perfect conductivity from the trachea or large bronchi to the surface.

Adventitious Sounds

Adventitious sounds are abnormal sounds and are divided into three groups. These are rales, succussion sounds, and friction sounds.

Rales.—The whole subject of rales can be greatly simplified by understanding their origin. The normal sounds which are heard during breathing are the breath sounds. In certain pathological conditions, however, blood, mucous, or other substances may lie in the bronchial tubes and vibrate as the air enters or leaves these tubes. These vibrations give rise to sounds which are known as rales. They are classified in two main divisions: first, the dry rales; second, the moist rales. They are designated as large or small, depending upon whether they arise from the large tubes and vibrate slowly or from the small tubes and vibrate rapidly.

Dry rales are produced by the passage of air through partly occluded bronchial tubes. This occlusion may be the result of congestion or the accumulation of stringy, viscid mucous. If heard toward the end of inspiration and if having a high pitch, they arise from the small bronchial tubes; and they are known as sibilant or small rales. If they are heard during both inspiration and expiration, and if they are of a low pitch; they arise from the larger tubes and are known as sonorous or large rales. Dry rales are found in the early stages of bronchitis and during the spasm of bronchial asthma.

Moist rales are classified as crepitant, subcrepitant, and coarse or mucous. Crepitant rales arise in the alveoli of the lung and are heard at the end of deep inspiration. The sound is simulated by crumbling a piece of delicate tissue paper. They are present at the apex in the early stage of pulmonary tuberculosis and at the base of the lung in the early stages of pneumonia. They are also present in pulmonary edema, embolism, and thrombosis.

Subcrepitant rales (small moist rales) are heard during both inspiration and expiration and arise from the presence

of fluid in the small bronchial tubes. They are heard over all parts of the chest in bronchopneumonia and may be heard in localized areas in tuberculosis and lobar pneumonia.

Coase rales (mucous rales) may be heard both during inspiration and expiration. They arise from the large bronchial tubes. They may be heard in pulmonary tuberculosis, whooping cough, and bronchitis when the exudate is abundant.

Succussion Sounds.—Succussion sounds are splashing sounds which are heard as the body is shaken from side to side. These sounds are significant of hydropneumothorax, but they should not be confused with the splashing sounds which may arise from the abdominal cavity.

Friction Sounds.—Friction sounds are variable in character, depending on their source. They result from actual friction between the layers of the pleura or those of the pericardium. They are usually associated with pain and are particularly in evidence during the early stages of pleurisy and pericarditis.

CHAPTER IX

DISEASES OF THE RESPIRATORY SYSTEM

Acute Nasal Catarrh

Definition.—Acute nasal catarrh is also known as **coryza** and a **cold in the head.** It is a catarrhal inflammation of the mucous membrane lining the nose and its communicating cavities characterized by disorders of smell and an abnormal mucous discharge.

Adjustment.—Cervical adjustments are important to restore normal nerve function in the membranes of the nose and sinuses. It is also important to administer those adjustments which will improve elimination and rid the body of toxic material. Middle and lower dorsal adjustments and in some cases lower lumbar adjustments will improve elimination.

Pathology.—The affected mucous membranes become hy-

peremic and edematous, impairing nasal breathing. The normal secretion of mucous is diminished and replaced by a colorless watery fluid. By the third day the discharge becomes mucoid or mucopurulent. At the end of a week the discharge is mucopurulent or purulent. The swelling of the turbinated bodies may occlude drainage of the sinuses which have become involved in the inflammation. Thus sinusitis is a common complication of the ordinary head cold. The inflammation may extend from the nose to the nasopharynx and pharynx; this extension may lead to involvement of the lining of the eustachian tube by the inflammatory process. Occlusion of the eustachian tube impairs hearing and prohibits discharge of exudate formed in the tube or middle ear; this leads to otitis media. When the sinuses or middle ear become involved, specific infections tend to develop.

Nerve Tracing.—Tenderness is diffuse over the face and sides of the neck. The zones in which tenderness is most marked are of value in determining the cervical adjustment.

Symptoms.—An acute cold often begins with sneezing and a feeling of dryness in the nostrils. There may be headache and chilliness along the spine. Frequently there is sore throat which involves the uvula and soft palate. There may be slight fever, usually under 101 degrees. When the patient is in the reclining position, nasal breathing becomes difficult or impossible. A change in position tends to open the side of the nose which is uppermost. There is watering of the eyes, and a thin acrid secretion is discharged from the nose. The senses of smell and taste are usually impaired. The cervical lymphatic glands are enlarged and may be tender. Herpes may develop upon the nose and lips. In three to five days the nasal discharge becomes copinous and mucopurulent; it is usually a yellowish color and subsides in the course of ten days to two weeks. The inflammation may extend downward into the pharynx and ultimately the larynx, trachea, and bronchi; it is then known as pharyngitis, laryngitis, tracheitis, or bronchitis.

Chronic Nasal Catarrh

Definition.—Chronic nasal catarrh is also known as **chronic rhinitis.** It is usually a continuation of the acute form. After a series of acute colds, the inflammation may become subacute and ultimately chronic.

Adjustment.—Same as acute nasal catarrh.

Pathology.—In chronic rhinitis the affected membranes remain hyperemic from the acute stage. There is a continuous exudate of mucous or mucopurulent material. In due time the membranes become thickened as a result of a hypertrophic process, thus diminishing the size of the air passages. The turbinated bodies are enlarged and frequently the sinuses are poorly ærated. This stage is known as hypertrophic and sooner or later merges into the atrophic stage.

In the atrophic stage the hypertrophied membranes gradually undergo atrophy; this enlarges the size of the nasal cavity. There may be ulcerations upon the septum or in the inferior meatus. The secretion is thick and tenacious and forms into hard green crusts. Often an offensive odor emanates from the discharge; this condition is then designated as **ozena.**

Symptoms.—Subjects of chronic nasal catarrh complain of having a chronic cold in the head. The air passages are reduced in size or obstructed. There is a more or less constant sniffling and nasal discharge which may form into crusts. Mouth breathing is the rule. The voice becomes nasal in tone, and dysphonia or aphonia frequently follows prolonged use of the voice. In the course of several years catarrhal or middle ear deafness is a common result.

Sinusitis

Definition.—Sinusitis is an inflammation of the mucous membrane of any of the accessory sinuses of the nose, usually with occlusion of their drainage ducts.

Adjustment.—Cervical or upper dorsal adjustments directly influence the nerves supplying the accessory sinuses. Middle dorsal and lower dorsal adjustments which increase the elimination of body toxins are of value in effecting a prompt recovery.

Pathology.—Invariably there is nasal inflammation with engorgement of the turbinated bodies and edema of all membranes. In many cases a deflection of the nasal septum mechanically contributes to blockage of the sinuses. Much of the pain is due to pressure within the sinuses that is a direct result of this blockage. During the acute stage there is no exudate; the nasal lining appears dry. After a week or more mucopurulent material is discharged with subsidence of the pain.

Symptoms.—During the acute stage pain is the outstanding symptom. It should not be confused with the headache of rhinitis; the latter is produced chiefly by pressure of the superior turbinated body upon the nasal septum. When the antrum is affected, the pain is largely in the cheek and side of the head. When the frontal sinuses are involved, the pain is largely in the eye and the brow above it. These two sinuses may be transilluminated and if congested will be cloudy upon transillumination. The pain of an acute frontal sinus involvement is usually absent during the night; it develops during the middle of the forenoon and subsides in the early evening. Cervical adjustments or concussion of the spinous processes of the cervical or upper dorsal vertebræ usually induce vasoconstriction and afford prompt relief. When the frontal sinus or antrum drains, the discharge is into the anterior part of the nose.

When the ethmoid sinus is involved, the pain may be distributed over a branch of the trifacial nerve; it may radiate into the side or even back of the head. Radiographic negatives of the ethmoid and sphenoid sinuses show opacity if involved by the inflammatory process. Discharge from these

sinuses causes a dropping into the throat, and pharyngitis is a common complication.

Enlargement of the cervical lymphatics and stiffness of the muscles of the neck are a common occurrence in all inflammations of the nose and its accessory sinuses. The pain is severe and may be neuralgic or congested and throbbing.

Hay Fever

Definition.—Hay fever is an acute irritation of the mucous membrane lining of the upper respiratory passages. It is characterized by a watery discharge from the nose, sneezing, and often difficult respiration.

Adjustment.—Interference with nerve function at any cervical or upper dorsal vertebral foramen may be the primary cause of hay fever. Middle and lower dorsal adjustments which tend to normalize the chemistry of the body should be included.

Pathology.—The mucous membranes of the nose, eyes, nasopharynx, pharynx, larynx, or bronchi may be congested. The exudate is thin and watery. The affected membranes are highly sensitive but do not undergo hypertrophy even after numerous recurrences.

Symptoms.—Hay fever is also known as **hay asthma**, the **rose cold**, and **autumnal catarrh.** It is frequently an allergy. Allergic substances include dandruff from the fur of animals, dust from feathers, pollen from plants, and many other irritating substances.

The typical case makes its appearance in the late summer. It is of sudden onset with attacks of sneezing, watering of the eyes, and uncomfortable feeling in the nasopharynx. The watery discharge from the nose and eyes is often very profuse. The special senses of taste, smell, and hearing may be impaired. When the larynx and bronchi are affected, there is dyspena, dysphonia, and cough. Expectoration may be

scant or absent. The attacks of dyspena may be protracted for several days, sometimes becoming severe.

The typical case of hay fever lasts from four to six weeks. There are usually a few days to a week during which the symptoms are most intense. Symptoms subside promptly with the first frost if the case is due to the pollen of plants.

Cases in which the pollen of plants is not a causative factor are not seasonal. The attacks are induced by contact with the irritant and subside when the irritant is absent. Many of these cases are not designated as hay fever but rather as asthma even though the eyes and nose become congested. Those who are susceptible to the pollen of the cottonwood tree may develop it in April or May, while the rose cold is more common in spring and early summer or whenever the patient is brought in contact with roses.

DISEASES OF THE LARYNX

Acute Catarrhal Laryngitis

Definition.—Acute catarrhal laryngitis is an acute nonspecific inflammation of the mucous membrane lining the larynx. It is characterized by fever, hoarseness, and catarrhal exudate.

Adjustment.—Lower cervical in conjunction with middle and lower dorsal adjustments are indicated.

Pathology.—The mucous membrane of the larynx is hyperemic and edematous. The normal mucous secretion is altered and increased in quantity. Edema of the vocal cords diminishes their tension and causes dysphonia or aphonia.

Symptoms.—The onset may be sudden with tickling in the throat, hoarseness, and metallic cough. More often laryngitis is a secondary development during the course of a coryza. The larynx becomes involved a few days after the onset of a cold. Its involvement is indicated by the husky voice or complete loss of voice. As a rule there is no laryngeal stenosis, and

breathing is not altered. In children the edema often produces a degree of obstruction that induces stridor. The average duration is two weeks. Occasional cases become subacute and chronic.

Chronic Laryngitis is due to prolonged irritation of the laryngeal membranes which dates from an attack of acute laryngitis. Excessive use of the voice, the inhalation of smoke and dust, all tend to favor chronic laryngitis. The condition is common among auctioneers and others who misuse their voices, particularly in talking loudly outdoors. Recurrent acute attacks of laryngitis cause these ever present symptoms to become more severe. In due time the membranes become hypertrophied and hoarseness is permanent.

Spasmodic Laryngitis

Definition.—Spasmodic laryngitis is a catarrhal inflammation of the membrane lining the larynx which is associated with a temporary spasm of the intrinsic laryngeal muscles. The condition is also known as **spasmodic croup, catarrhal croup, false croup,** and ordinary **croup.**

Adjustment.—Spasmodic laryngitis responds readily to the proper lower cervical adjustment.

Symptoms.—Croup occurs in spasmodic attacks which are usually nocturnal. They begin suddenly with no premonitory symptoms. The child awakens with a sense of suffocation, a harsh metallic cough, and an intense dyspnea. The face may become cyanosed during a paroxysm of coughing. Young children are often frightened, and their crying in no way mitigates the severity of the dyspnea. The attack of dyspnea is promptly terminated in the event of vomiting. There is a tendency for the attack to recur nightly, the succeeding attack being somewhat milder than the preceding one. As a rule the attacks of dyspnea are less than one-half an hour in duration. It is due to the condition of laryngismus which may occur with laryngitis. When the dyspnea terminates, hoarseness

persists until the following day and again becomes more pronounced in the evening. The proper adjustment during an attack affords prompt relief.

Laryngismus Stridulus

Definition.—Laryngismus stridulus is a motor neurosis involving the intrinsic laryngeal muscles. It is characterized by the sudden development of dyspena and cyanosis.

Adjustment.—The adjustment is usually lower cervical, but any cervical nerve pressure may cause an attack.

Symptoms.—This is also called **child-crowing, thymic asthma,** and **spasm of the glottis.** It is more common in children but may affect adults. Attacks generally occur during the night. The patient awakens with a sense of suffocation, severe dyspnea, and sometimes a croupy cough. The accessory muscles of respiration participate in the act of breathing during this dyspnea. There is often a high-pitched crowing sound upon inspiration. Breathing may cease for several seconds during which time the cyanosis deepens. The attack may be accompanied by a loss of consciousness and occasionally convulsions. As a rule the spasm ceases within thirty minutes, but there may be recurrences. Fever is absent. There are no symptoms between the attacks.

Edema of the Larynx

Definition.—Edema of the larynx is a condition in which there is infiltration of serum in the mucous membrane of the larynx and its underlying areolar tissues. The condition may be inflammatory or noninflammatory. Inflammatory edema is usually mild in acute and chronic laryngitis but may be very severe in specific infections of the laryngeal membranes.

Noninflammatory edema may be caused by thrombi or growths obstructing the veins in laryngeal membranes.

The symptoms of laryngeal edema vary with the cause.

When inflammatory in nature, there may be sore throat, cough, hoarseness, and difficulty in breathing. When edema is severe, vocal sounds are impossible. Cyanosis develops, and the patient assumes an erect position to aid the accessory respiratory muscles. The face will show an anxious expression due to fear of suffocation. If the larynx becomes stenosed, it will be elevated with each expiration and lowered with inspiration. Inspection of the larynx is of value in determining the severity of the condition.

Tuberculosis of the Larynx

Definition.—Tuberculosis of the larynx is a tuberculous inflammation of the larynx characterized by ulceration, emaciation, and weakness.

Adjustment.—Since laryngeal tuberculosis is secondary, the adjustments will vary according to the site of all lesions. Lower cervical, upper dorsal, and lower dorsal areas should be carefully examined in all cases.

Symptoms.—The symptoms of chronic laryngitis are present long before the condition is suspected as being tuberculosis. There are hoarseness, cough, and expectoration. The expectorate becomes more profuse and may be bloodstained at times. In due time an intermittent fever arises: the temperature may be subnormal in the morning and vary between 99 and 100 degrees during the later part of the day. The hoarseness gradually increases, and there is complete aphonia. There is impairment of the general health with loss of weight and anemia. Examination of the thorax will reveal lung changes that exist; examination of the sputum will reveal pus, blood cells, bacteria, and often ulcerated tissue. Laryngoscopic examination is of value in detecting the condition.

Laryngotracheobronchitis

Inflammations of the respiratory passages are rarely confined to one organ, such as the nose, the larynx, the trachea,

or the bronchi. This is particularly true in young children who are susceptible to respiratory diseases during the winter months. Both catarrhal and infectious inflammations may arise in the throat and spread to the larynx, trachea, and bronchi. In the catarrhal cases the condition is adequately covered by the term coryza; and while there may be slight fever, the child is rarely bedfast. When the condition is of an infectious nature, there may be high fever and an increased pulse and respiration rate. Hoarseness develops as a result of edema in the larynx, while large and medium sized rales develop as a result of exudate in the trachea and bronchial tubes. These cases require careful attention due to the possibility of developing severe laryngeal edema with stenosis. Two adjustments per day are recommended.

DISEASES OF THE BRONCHI

Chronic Bronchitis

Definition.—Acute bronchitis is a nonspecific inflammation of the mucous membrane lining the bronchial tubes. It usually involves the trachea and the larger divisions of the bronchial tubes. It is also known as **cold on the chest.**

Adjustment.—Lower cervical or upper dorsal adjustments in combination with lower dorsal are indicated in bronchitis.

Pathology.—The inflamed mucous membranes are deeply hyperemic and edematous. They are covered with a grayish exudate composed of altered mucous which is very viscid. After a few days the exudate becomes yellowish and is mucopurulent in character.

Symptoms.—Acute bronchitis may be preceded by or accompanied with coryza. The body temperatures vary from 100 to 102 degrees. The throat is sore, and there may be slight hoarseness. The cough is violent and at first dry. After three or four days the cough becomes loose and is accompanied with profuse expectoration. The expectorate may be

clear and mucoid in appearance or may be mucopurulent. There is a sense of constriction in the chest, and the patient complains of soreness, a result of muscular activity caused by coughing. Examination reveals moist rales over the bronchial tree of varying size and intensity. When the examination is made immediately after cough and expectoration, all physical signs may be lacking. The usual duration is ten days to two weeks.

Chronic Bronchitis

Definition.—Chronic bronchitis develops after a series of acute attacks. It may be secondary to other bronchial or pulmonary diseases. It is most common among men whose occupations compel the inhalation of dust and fumes. It is extremely common among smokers.

Adjustment.—Lower cervical or upper dorsal vertebral adjustments are indicated in chronic bronchitis.

Pathology.—During the earlier stages there is congestion and edema of the mucous membrane and an exudation of mucous from its follicles. In chronic cases the mucous membrane is thickened and inelastic; hence the lumen of the bronchial tube may be diminished in size. The muscular tissue usually undergoes atrophy.

Symptoms.—Chronic bronchitis may be classified as dry and moist. The **dry catarrh** is characterized by hacking cough which may be associated with chronic laryngitis. Expectoration is not prominent, but a small glairy pellet of mucous may be raised from time to time. During the cold months there may be one or more attacks of acute bronchitis which always increases the cough and expectoration. During the summer months there is little more than a bronchorrhea.

Moist catarrh of the bronchial tubes is accompanied with profuse expectoration and paroxysmal cough. The attacks of cough are most marked in the morning and terminates after considerable mucopurulent expectoration. As a rule the tongue

is coated; the breath is foul; breathing is labored; and the patient may be emaciated. There is often a condition of asthma or emphysema associated, and many cases of chronic moist catarrh of the bronchial tubes lead to bronchiectasis.

Bronchiectasis

Definition.—Bronchiectasis is a chronic inflammatory disease of the bronchial tubes in which their walls are dilated. The sacculations become filled with putrid exudate which induces recurrent attacks of coughing with profuse expectoration. The disease may be unilateral or bilateral.

Adjustment.—Adjustments are indicated in the upper and lower dorsal areas of the spine.

Pathology.—Bronchiectasis is preceded by bronchitis, pneumonia, or tuberculosis in which recovery was not complete. The mucous membrane is congested and covered with mucopurulent secretion. Epithelial cells may desquamate and expose small dilated vessels. The destruction of the bronchial wall varies greatly, but in all cases there is some degree of connective tissue proliferation. The dilatations vary in size and number. They rarely affect the large tubes having cartilaginous rings but are abundant in the smaller bronchial tubes.

Symptoms.—Chronic bronchitis or an attack of pneumonia precedes the development of bronchiectasis; hence the early symptoms are those of the primary condition. Cough is the chief symptom which recurs with attacks of coryza. When the sacculations form, the cough becomes paroxysmal in nature; the coughing is most severe in the morning upon arising or in the evening upon retiring. During the time the posture remains unchanged, the secretion accumulates in the sacculations; and when the position is changed, the pus overflows, inducing the attack of cough. The amount of expectoration depends upon the number and size of the sacculations. The

sputum may be of foul odor or it may be odorless. Upon standing it separates into three layers: the upper layer is of a brownish color and frothy; beneath this there is a thin yellowish-green mucoid layer; and in the bottom there is a deposit of sediment consisting of pus, mucous, and destroyed epithelium. Many cases enjoy good health but are susceptible to respiratory infections. Advanced cases have a slight fever and may have hemoptysis. X-ray is of value in detecting the condition.

Fibrinous Bronchitis

Definition.—Fibrinous bronchitis is an inflammation of the membrane lining the bronchial tubes accompanied by the formation and expulsion of fibrinous casts. It is also known as **plastic bronchitis** and **membranous bronchitis.**

Adjustment.—Upper and lower dorsal adjustments are indicated.

Pathology.—The mucous membrane becomes hyperemic and edematous as in a catarrhal involvement. The exudate consists of grayish white mucous rich in fibrin. This exudate remains firmly attached to the surface from which it exudes because of its viscid properties. During the course of a week cells in the exudate undergo suppuration. This destroys the viscid property of the fibrin and permits expulsion of the cast. The cast will float in water and may be unraveled to show the divisions of the bronchial tree.

Symptoms.—The onset may be sudden with chills, fever, intense cough, and dyspnea. The majority of cases have an onset similar to that of catarrhal bronchitis. There are slight fever, a paroxysmal cough increasing in violence and dyspnea. The dyspnea is progressive for five or six days during which time the cough may be nonproductive. Toward the end of the week suppuration occurs and pellets of apparent mucous are expectorated. These pellets may be bloodstained. With the expulsion of these casts, dyspnea and cyanosis are promptly relieved. There may be recurrences and occasionally the disease becomes chronic.

Fibrinous bronchitis differs from bronchial asthma in that its dyspena is progressive for several days and is relieved upon the expulsion of casts. Asthma has no casts, usually occurs without fever, and its attacks may terminate without cough or expectoration.

Bronchial Asthma

Definition.—Bronchial asthma is a chronic affection of the bronchial tubes characterized by dyspnea which recurs at intervals, a sense of constriction in the chest, and wheezing sounds.

Adjustment.—Most cases of bronchial asthma respond to lower cervical or upper dorsal adjustments. This is particularly true when the asthmatic condition is a neurosis. There may be inflammation and sources of toxemia that require corrective adjustments in corresponding zones.

Pathology.—True bronchial asthma is essentially a motor and vasomotor neurosis. Vasodilatation causes a neurotic hyperemia with moderate edema in the bronchial mucosa. A spasmodic contraction occurs in the muscle fibers of the bronchial tubes which diminishes during inspiration and increases in intensity during expiration. Asthma may be associated with bronchitis, in which event there is thickening of the bronchial wall as a result of prolonged proliferation of the connective tissue elements.

Symptoms.—Occasionally there are premonitory symptoms which may consist of nervous chills, mental depression, vertigo, and thoracic oppression. Many patients say they are nervous preceding the attack. Most cases are of sudden onset and occur during the night. The patient awakens with a sense of suffocation and thoracic discomfort. He assumes the upright position which aids the accessory muscles of respiration. Some patients seek more air near a window. They often brace their elbows or hands which elevates the shoulders. The

respiratory efforts become violent. The dyspnea is intense and noisy. There is a prolonged wheezing sound upon expiration, from which the disease obtained the name expiratory dyspnea. Inspirations are with less effort and are of short duration. The face may be pale and the expression anxious. Later in the attack cyanosis develops, and the patient may be drenched in perspiration. The attack of intense dyspnea may last from a few minutes to several hours. It may terminate as abruptly as it started and occasionally may do so with much coughing and scanty expectoration. Repeated attacks of bronchial asthma cause hypertrophic emphysema and a barrel chest. The stretching of the lung tends to flatten the pulmonary capillaries and thus restricts pulmonary circulation. Most cases of chronic asthma have hyperaccentuation of the second pulmonary valve sound and may develop hypertrophy of the right ventricle.

Patients who have suffered asthma for a period of years develop a marked prominence of the lower cervical and upper dorsal verterbræ known as the asthmatic hump. The upper two vertebræ in this miniature kyphosis are tipped toward the superior. This is probably due to the cervical lordosis which is induced by overactivity of the sternomastoid muscle. Spinous process contacts in adjusting these vertebræ have been found to be more effective in overcoming attacks of bronchial asthma.

DISEASES OF THE LUNG

Pulmonary Congestion

Definition.—Pulmonary congestion may be active or passive. The term **active congestion** is applied to dilatation and distention of the arterioles. **Passive congestion** is an engorgement of the lung capillaries due to obstructed drainage through the veins. It commonly occurs in mitral diseases and decompensation of the heart muscle.

Hypostatic congestion is a form of passive congestion in-

duced by the force of gravity and occurring in extremely debilitating diseases.

Adjustment.—Spinal subluxations that commonly produce pulmonary congestion are in the upper dorsal region of the spine. In active congestion they may cause vasodilatation because of inhibiting the flow of vasoconstrictor impulses, or the nerve impingement may be a causative factor when there is inflammation. In passive congestion upper dorsal subluxations impair the flow of vital energy to the heart.

Pathology.—The blood vessels are dilated and distended. The lung tissue has a dark red appearance. There is a collection of serum and cells in the alveolar sacs. The lung tissue is heavy because of diminished air space.

Symptoms.—Active congestion is arterial and may be neurotic or inflammatory in nature. There are labored breathing, flushed face, and sometimes chest pain. The pulse is strong and regular. There is usually a dry cough. When the condition is advanced, the cough is productive and accompanied by bloodstained frothy sputum. When inflammatory in nature there is fever of varying intensity. Subjectively the patient may observe the taste of blood in his mouth even though no blood has appeared in the sputum. This condition may be induced by prolonged overexertion, inhalation of irritating fumes, pneumonia, or tuberculosis.

Passive congestion develops at the base of the lung in the ambulatory case. Physical signs may be detected below the 6th rib at the back in advanced mitral disease or in congestive failure of the heart. The condition usually develops slowly with difficulty in breathing upon slight exertion, cough, and frothy expectoration. When the congestion is severe, the sputum may be bloodstained or there may be hemoptysis. Cardiac symptoms and signs correspond to the heart condition producing the congestion.

Hypostatic congestion is encountered in protracted fevers and other debilitating diseases. It is more apt to occur when

the patient is kept in a constant position for long periods. Since most such cases assume the dorsal passive posture, the posterior and lower part of the lung is the seat of the congestion. Examination will reveal increased vocal fremitus; the percussion tone is that of impaired resonance; the breath sounds are bronchovesicular accompanied by crepitant rales. When fever develops with a hypostatic congestion, the condition is spoken of as **hypostatic pneumonia.**

Pulmonary Edema

Definition.—Pulmonary edema is an infiltration of blood serum into the interstitial tissue and alveoli of the lungs. It is associated with and cannot be completely separated from pulmonary congestion.

Adjustment.—Upper dorsal adjustments are always indicated. In addition adjustments should be applied to those regions of the spine that may be causative factors in infectious or toxic diseases that coexist.

Pathology.—The edematous lung is heavy and firm, as the accumulated serum leaves but little space for air. It pits upon pressure and tends to sink when placed in water.

Symptoms. Pulmonary edema is first associated with all congestions of the lung. Consequently the onset is that of the the congestion with which it is associated. Secondly, pulmonary edema occurs as a terminal development in most cases of pneumonia. This is due to dilatation of the right ventricle because of resistance encountered in the lung capillary bed. If the heart dilates in a case of lobar pneumonia involving one lung, edema promptly develops in the unaffected portion of the pneumonic lung and in the unaffected lung.

The patient is conscious of great thoracic oppression; the breathing is rapid and labored. There is a frequent short cough accompanied with frothy expectoration which may be bloodstreaked. Profuse pulmonary hemorrhages occasionally occur. The face is pale and moist. The facial expression is

anxious. The pulse is rapid and thready, and ultimately large moist mucous rales known as the death rattle develop.

Bronchopulmonary Hemorrhage

Definition.—Bronchopulmonary hemorrhage is an oozing of blood from the vessels of the lungs or the lining of the bronchi. It is also known as **hemoptysis** and **bronchorrhagia.**

Adjustment.—Upper dorsal adjustments restore normal vasomotor expression in the pulmonary vessels.

Pathology.—Hemorrhage is preceded by congestion or engorgement. The blood vessels are dilated and distended. Further dilatation permits the escape of blood. There may be large hemorrhages as a result of erosion of a vessel wall by destructive disease such as tuberculosis. These hemorrhages occur directly into a bronchial tube or lung cavity and are known as pulmonary hemorrhage.

Symptoms.—A large number of cases are unaware of the possibility of bronchopulmonary hemorrhage until they expectorate blood. The amount may be small or large. At first there is a tickling sensation in the larynx which induces clearing of the throat or coughing. The cough is accompanied by a flow of warm salty-tasting blood in the mouth. The emotional state that follows accelerates heart action and tends to prolong the hemorrhage. The blood is bright red in color, is somewhat frothy, and tends to cling to the teeth and membranes of the mouth. Most cases promptly subside after an adjustment with quietness in the horizonal position. In large pulmonary hemorrhages adjustments which would increase pressure upon the thorax are contraindicated. Occasionally there is an expectorate for several days following hemoptysis; the sputum may be bloodstained.

Hemoptysis differs from hematemesis in that in hemoptysis the blood is bright red in color, alkaline in reaction, and raised by clearing of the throat or cough. In hematemesis the blood is vomited; it is acid in reaction and dark in color.

Embolism and Thrombosis

Definition.—Embolism is an obstruction to an artery in which the embolus is carried to the point of obstruction by the blood stream. Emboli usually consist of destroyed endothelium from the heart or blood vessels. It may consist of a portion of a thrombus and may be conveyed to the lung from remote parts of the body, particularly through the inferior vena cava.

Thrombosis is an obstruction of a blood vessel which forms in situ. It may consist of a clot which develops in the vessel wall at a point of local injury by disease or bacteria. When embolism or thrombosis develops in the lung, it results in a triangular-shaped portion of the lung which is devoid of air and filled with infiltrated blood. The condition usually affects some branch of a pulmonary artery.

Symptoms.—Embolism always occurs in the pulmonary artery while thrombosis may occur in both arteries and veins. The obstruction may be single or multiple and varies in size. When a small vessel is obstructed, no symptoms may occur; while obstruction of a large vessel may cause death. In typical cases there are pain in the chest, cough, dyspnea, and blood-streaked expectoration. The facial expression becomes anxious, and the patient sweats profusely. The pulse becomes rapid and small. The sputum is composed of mucous and coagulated blood. In favorable cases these symptoms of shock gradually subside: the pulse becomes slower and larger; the sweating and pallor disappear; the patient begins to feel warm; and expectoration gradually subsides. The more severe cases develop physical signs which consist of pulmonary dullness on percussion, bronchial breath sounds, moist rales, and friction sounds. In such cases the symptoms of collapse persist until expiration.

Embolism of the lung may be septic in nature if it occurs in disease producing pyemia. The emboli are small but numerous. They are often situated near the pleura and may

produce abscesses. When septic the suppurative type of fever is a prominent additional symptom.

Bronchopneumonia

Definition.—Bronchopneumonia is an acute inflammation of the lungs beginning at the terminal bronchioles and spreading to adjacent lobules. Bronchopneumonia is also known as **bilateral pneumonia, catarrhal pneumonia, lobular pneumonia,** and **capillary bronchitis.**

Adjustment.—Adjustments should be made in the upper, middle, and lower dorsal regions of the spine.

Pathology.—Bronchopneumonia may begin with coryza or bronchitis. It often develops when the lung tissue has been injured by the inhalation of chemical irritants or physical agents. Among the latter is included those cases known as aspiration pneumonia.

The vessels in the lining of the terminal bronchioles become engorged. Gradually this engorgement extends to the communicating alveoli, and exudate of viscid mucous containing leukocytes and epithelial cells fills the involved alveoli. If capillary dilatation is great, red blood cells may escape and become part of the exudate. The condition usually affects both lungs but does not affect all lobules nor even all alveoli in a lobule. The consolidated areas thus occur as patches between which there may be normal lung or areas of emphysema. During resolution the exudative material undergoes disintegration. Chronic consolidation and the formation of abscesses is rare and occurs only in cases developing a secondary infection.

Symptoms.—The onset of bronchopneumonia is gradual with pleurisy pain in the chest. There is a gradual rise in the body temperature which varies from 100 to 104 degrees. In the cases having high fever, the onset is abrupt with a chill preceding the rise in temperature. The fever follows a remittent course having daily variations in excess of two degrees.

The respiratory movements are often jerky and vertical. There may be inspiratory retraction of the lower ribs near the sternum. There is marked tenderness of the thorax over both lungs; this tenderness is traceable to the upper dorsal spine. Cough is frequent and accompanied by viscid expectorate which is sometimes bloodstained.

In mild cases inspection and palpation reveal no physical signs, but in well-defined cases intercostal retraction may be observed during inspiration. Palpation reveals increased vocal fremitus. Percussion reveals impaired resonance. Upon auscultation will be heard subcrepitant rales that are clearly audible in most parts of the chest. The breath sounds are bronchovesicular. When pleurisy coexists, a friction rub is audible. A marked decrease in the cough and expectoration with an increased area of consolidation is unfavorable. Bronchopneumonia is very common in children and in old age.

Mild or subacute cases are difficult to recognize. There may be little or no cough, no expectoration; but there are malaise, anorexia, insomnia, and exhaustion. The temperature may be normal part of the day but usually rises above 99 degrees toward evening. The only physical signs are detected upon auscultation; they are bronchovesicular breath sounds and crepitant rales. They may be audible in the interscapular area only.

Aspiration pneumonia often follows the inhalation of food or vomitus. In the latter the acid stomach contents acts upon the bronchial and lung mucosa; the reacting engorgement is rapid and extreme. Signs of pulmonary edema and failure of the myocardium rapidly develop. The duration may be but a few hours.

Bronchopneumonia is not a self-limited disease; therefore, it has no definite course or duration. Acute cases may subside in a week, while others may become subacute and continue for two to three months. Bronchopneumonia is not a disease of bacterial origin, but bacteria frequently invade the diseased

structures after they have become diseased; this also causes the clinical course to vary. Furthermore, a bronchopneumonia may activate a latent pulmonary tuberculosis, in which event the symptoms of the bronchopneumonia are merged with those of tuberculosis which follows.

Bronchopneumonia differs from lobar pneumonia in that lobar pneumonia begins with a chill; it has high fever and prune juice sputum; and the consolidation involves one or more lobes. It is confined to one lung or one or two lobes of a lung. It is a self-limited disease and terminates by crisis about the end of a week. Its physical signs are intercostal retraction upon inspiration over the affected lobe, marked increase of vocal fremitus, dullness on percussion and bronchial breath sounds upon auscultation.

Chronic Interstitial Pneumonia

Definition.—Chronic interstitial pneumonia is a chronic inflammatory thickening of the connective tissue of the lung. It is also known as **fibroid pneumonia** and **cirrhosis of the lung.**

Adjustment.—Local adjustments in the upper dorsal spine are indicated.

Pathology.—The fibrotic changes occurring in interstitial pneumonia may be limited to a portion of a lung, portion of both lungs or an entire lung. If associated with a chronic tuberculosis process, it is usually called **fibroid phthisis.** When the fibrotic changes are activated by inhaled dust particles of coal, stone, iron, sand, and grain, the generic term **pneumoconiosis** is usually applied. When fibroid changes occur without knowledge of the above process or from other causes, it is termed interstitial pneumonia. The process may begin during an attack of lobar pneumonia, bronchopneumonia, influenza, measles, whooping cough, or bronchiectasis. In the early stages there are moderate congestion and gradual thickening of the connective tissue beginning at the hilus or apex of the

lung. In extreme cases the lung is contracted and occupies the upper and back portion of the thoracic cavity. The diaphragm upon the affected side is elevated, and the heart displaced toward the affected lung by reason of the compensatory emphysema developing in the other lung.

Symptoms.—During the early stages the most constant symptom is cough. The cough is dry and without great effort. It is frequently initiated by the inhalation of dust or cool air. Exertion produces dyspnea. In due time mucopurulent exudate may be raised upon coughing or clearing of the throat. Very rarely there is hemoptysis or blood-streaked sputum. Most patients afflicted are underweight, yet many of them are unable to report any loss of weight.

In advanced cases there is retraction of the respiratory muscles on the affected side during inspiration. The ribs approximate each other, and the spine is curved laterally toward the unaffected lung. On the affected side the vocal fremitus is increased. The percussion tone is dull. Auscultation reveals diffuse bronchial breath sounds excepting where a bronchial tube is completely obstructed.

The opposite lung develops compensatory emphysema. The intercostal spaces are wide and bulging. Vocal fremitus is diminished. The percussion tone is hyperresonant; and while the breath sounds are vesicular, they are feeble. This disease tends to be progressive over a period of many years and in itself does not terminate fatally. The resistance offered the pulmonary circulation places strain upon the wall of the right ventricle. As a consequence, the heart in due time may dilate. These patients are also highly susceptible to acute respiratory infections which involve the nonfibroid lung.

Pneumoconiosis

Definition.—Pneumoconiosis is a generic term applied to fibroid changes in the lung resulting from the inhalation of dust particles.

Adjustment.—Adjustments are indicated in the upper dorsal area of the spine.

Pathology.—There is a fibrosis which develops along the bronchial tree and particularly affects the lymphatic structures. This process spreads and involves entire lobules of the lung. Unaffected portions of the lung may become emphysematous. Cases of long standing may have dense fibrosis comparable to that of chronic interstitial pneumonia.

Symptoms.—Uncomplicated cases of pneumoconiosis may develop to an advanced stage without the presence of symptoms which attract the patient's attention. The most common symptom is labored breathing upon exertion. Cases having bronchitis or inflammatory lung diseases develop cough, which is often paroxysmal and accompanied by scant expectoration. The expectorated mucous contains particles of the inhaled dust and, therefore, varies in appearance. The X-ray is of value in determining the presence of pathological opacities in the lung.

When this condition develops in coal miners and is due to the inhalation of coal dust, it is called **anthracosis.**

In stone cutters the sputum, which is grayish in color, is ladened with particles of stone, and the disorder is called **chalicosis.**

In iron workers the sputum is of a rusty color, and the condition termed **siderosis.**

The term **fibrosis** is applied to a large group of cases including those due to the inhalation of dust from flour or grain as well as smoke and soot in large cities.

The term **silicosis** is applied to those cases where silica is the mechanical irritant. It is common among stone cutters, the makers of fine glass, molders, and those employed in the manufacture of abrasives.

Pulmonary Atelectasis

Definition.—Pulmonary atelectasis is a condition of collapse of the air cells of a lung or a portion of a lung.

Adjustment.—The upper dorsal area of the spine is indicated for adjustment.

Pathology.—More than 65% of pulmonary atelectasis follows surgery. The bronchial tubes supplying collapsed portions of the lung are occupied by tenacious mucous, a clot of blood, or a circumscribed wheal-like area of edema. In other cases a large bronchus is obstructed by bronchiectasis, tumors, or thoracic aneurysm. Atelectasis may develop as the result of spontaneous pneumothorax, hydrothorax, empyema, and tumors of the lung or pleura.

Symptoms.—If the area of collapse is small, no appreciable symptoms develop nor will there be any physical signs. When the area of collapse is large, the onset is sudden with pain in the chest. There is severe dyspnea with cyanosis. The respiration rate may rise to 36 or 50. The heart action corresponds with the respiratory rate. The facial expression is anxious. The temperature is moderately elevated, and the leukocyte count is ordinarily doubled.

Upon inspection it will be observed that the respiratory movements upon the affected side are greatly diminished or absent, while those of the unaffected side are increased. Palpation reveals decreased or absent vocal fremitus. If there is pneumothorax, the percussion tone will be tympanic, but directly over the collapsed lung there is dullness. Vocal resonance is diminished or absent. The breath sounds are absent.

Emphysema

Definition.—Pulmonary emphysema is a condition in which the alveoli of the lungs are inflated or ruptured.

Pathology.—There are two theories regarding the development of emphysema in the lung. The theory of inspiration holds that the stretching of the alveoli is directly produced by too forceful and prolonged inspiration. The theory of expiration holds that the stretching of the lung tissues is due to forced expiration in the presence of an obstruction. Since all

people who forcefully inhale or exhale air against resistance do not develop emphysema, it is apparent that the lung tissue must be in a weakened condition.

The lung tissue is pale red in color and the walls of the air vesicles are thin. When the lung tissues is stretched and all air cells enlarged, the condition is known as **hypertrophic emphysema. Compensatory emphysema** is unilateral and is adaptive to loss of function of the opposite lung. It is usually of the hypertrophic variety. When the air sacs are so ruptured that the air escapes into adjoining areolar tissue, it is known as **interstitial emphysema.** Many air sacs may coalesce as a result of rupture of the alveolar septum; such a condition is termed **atrophic emphysema.**

Symptoms.—Hypertrophic emphysema is the most common form. Cases of chronic bronchial asthma frequently develop it; also there is a tendency for it to develop in glass blowers and those who play wind instruments. The onset is gradual. Dyspnea is observed only upon exertion at the beginning, but in advanced cases the dyspnea is constant. The breath sounds are noisy and wheezing. Respiration always appears labored and is of the superior costal type. There may be cough and expectoration. The barrel or keg chest gradually develops until the anteroposterior diameter of the chest exceeds its lateral diameter. The veins of the neck are prominent, and the sternomastoid muscles are usually hypertrophied.

The intercostal spaces are wide and often bulging. The apex of the heart may be covered by stretched lung causing the apex beat to be invisible. Vocal fremitus is diminished. The percussion tone is hyperresonant. The breath sounds are of the vesicular type but feeble. Usually there are rales.

Compensatory emphysema is unilateral and is adaptive to deficient expansion of the opposite side. It is found as a symptom of fibroid phthisis, unilateral interstitial pneumonia, unilateral atelectasis, and tumors of the lung. Since this emphysema is unilateral, it causes a dorsal scoliosis, the convexity of which is toward the emphysematous lung. The physical signs are those of hypertrophic emphysema.

When only a small amount of air escapes into the areolar tissue of the lung, the condition goes unidentified. Larger amounts of air may move along the course of the bronchi and trachea in the areolar spaces where it forms a tumorous-like bulging. This usually can be observed above the episternal notch. The protruding tumor is soft and easily compressible. It does not pit upon pressure and reappears promptly when the pressure is removed. Subcutaneous emphysema is of the interstitial variety; it produces a soft uniform elevation. A fremitus may be produced by compressing the emphysematous area.

The atrophic form of emphysema may affect but a part of one lung. When the air cell wall ruptures, it undergoes atrophic changes. Since the working surface of the lung is diminished, the chest becomes smaller. The intercostal spaces become narrow because the ribs slant more obliquely downward. Respiration is often very difficult.

Abscess of the Lung

Definition.—Abscess of the lung is a circumscribed collection of pus surrounded by a fibrous wall.

Adjustment.—Adjustments are indicated in the upper, middle, and lower dorsal areas of the spine.

Pathology.—An abscess is the result of a suppurative inflammation. Pyogenic bacteria are always present. Abscesses may develop as a result of pneumonic consolidation in which resolution failed to occur. They are common in tuberculosis. They may be embolic in character resulting from pus emboli conveyed to the lung through the pulmonary artery. They may develop in connection with thrombosis and tumors of the lung. Pulmonary abscesses vary in size from that of a small tubercle to those several inches in diameter. Abscesses which result from chronic processes have a thick fibrous wall. They are more easily detected by X-ray. The cavity within the wall contains purulent bloodstained debris. Pulmonary

abscesses tend to perforate into a bronchus from whence the pus is raised and expectorated. Perforation through the pleura invariably produces empyema.

Symptoms.—At the onset the symptoms of pulmonary abscess are those of an acute bronchitis, influenza, or mild pneumonia. There is moderate fever, quickened pulse and respiration rate, and severe prostration. The cheek of the affected side is flushed. The cough may be non-productive. In the course of ten or twelve days the abscess ruptures. There is a sudden drop in temperature, and the patient expectorates bloodstained pus containing fragments of lung tissue. Hemoptysis may persist for several days. The patient becomes emaciated and extremely weak. Many abscesses drain for a few weeks, after which the opening closes and the cavity refills with pus. Upon perforating there is recurrence of the cough and purulent expectoration. In favorable cases each recurring abscess is smaller than its predecessor, the inflammatory process gradually diminishing. In unfavorable cases the abscess tends to enlarge and may even multiply in number. Physical examination is of value in locating abscesses near the pleural surface, but then only those of considerable size. The X-ray examination is the preferred method of determining the presence of pulmonary abscesses.

Tumors of the Lung

Definition.—Tumors of the lung are usually carcinomas which may be primary or secondary. Sarcoma occasionally occurs but usually arises from connective tissues in the mediastinum or the connective tissue of the lung.

Adjustment.—Upper and lower dorsal areas should be examined.

Symptoms.—Primary carcinoma of the lung is more common than was formerly suspected. Today it causes nearly 10% of the deaths due to cancer. The vast majority of causes of pulmonary carcinoma occur in men after 40 years of age.

Nearly all of these patients are chronic smokers. When the growth is small, the symptoms may be latent. As it enlarges, pressure symptoms arise: there may be dyspnea from pressure upon the trachea or bronchi, dysphagia from pressure upon the esophagus, dysphonia or aphonia from pressure upon the inferior laryngeal nerve, edema of the face and neck or upper extremities from pressure upon the superior vena cava. There are usually pain, progressive emaciation, and cachexia. There is cough which is usually productive of purulent sputum and blood. When bloody the sputum is frequently spoken of as current jelly sputum. There is usually a slight intermittent fever which alternates with profuse sweats. In many cases the pleura, intercostal nerves, ribs, and vertebrae become involved by secondary carcinomas. The cardinal symptoms are pain, emaciation, anemia, cough, and bloody sputum.

DISEASES OF THE PLEURA

Pleurisy

The pleura is a serous membrane covering the lungs. It is reflected upon the walls of the thorax and superior surface of the diaphragm. That portion which surrounds the lungs is known as the visceral layer, while that which is adherent to the thoracic wall is the parietal layer. The pleura covering the diaphragm is known as the diaphragmatic pleura.

Pleurisy like other inflammations of serous membranes passes through three stages, namely, fibrinous, serofibrinous, and purulent. Instead of these being three different diseases, they are different stages of an inflammatory process.

Fibrinous pleurisy may result from fracture of a rib, separation of a costal cartilage, a deep-seated contusion of the thoracic wall, or exposure. Such cases will not become suppurative unless infection develops. Fibrinous pleurisy associated with tuberculosis or pneumonia is infectious from the onset and tends to pass from the fibrinous stage to the serofibrinous stage to the purulent stage.

Acute Fibrinous Pleurisy

Definition.—Acute fibrinous pleurisy is an inflammation of the pleura accompanied by a fibrinous exudate.

Adjustment.—Adjustments should be made in the zone of the pleura inflamed. This may be any dorsal vertebrae since the pleura is supplied by each of the dorsal sympathetic nerves.

Pathology.—Fibrinous pleurisy is rarely bilateral but usually unilateral and when unilateral may involve but a small portion of the visceral or parietal pleura. The affected portion of the pleura is hyperemic and rough because of the fibrinous exudate upon its surface. The viscid nature of this exudate tends to promote the development of adhesions.

Symptoms.—Fibrinous pleurisy is also known as **dry pleurisy** and **adhesive pleurisy.** It begins suddenly with stitch pain in the region of the nipple, axilla, or scapula. The pain is increased upon movement of the arms, deep breathing, and coughing. All movements which increase the pain are suppressed. The patient tends to lean toward the painful side. There is usually a slight fever with increased pulse and respiration rate and often a dry cough which is always suppressed.

The principal physical sign is a friction sound audible toward the end of inspiration; this sound terminates abruptly when the inspiration is suppressed. The breath sounds are not altered in character but are of diminished intensity when the amount of fibrin is large.

Intercostal neuralgia differs from dry pleurisy in that it is not accompanied by fever, does not have friction sounds, and does not have increased pain upon movement.

Serofibrinous Pleurisy

Definition.—Serofibrinous pleurisy is known as **pleurisy with effusion.** In addition to the fibrinous exudate there is an effusion of serum from the capillaries into the pleural cavity.

Adjustment.—Same as fibrinous pleurisy.

Pathology.—The pleural vessels are engorged. There is fibrinous exudate on the surface of the pleura. The pleural cavity contains blood serum varying from a few ounces to three or four quarts. The serum contains leukocytes, albumin, and often red blood corpuscles. The serum is clear or very light straw-colored, except when containing blood or pus. Upon removal the fluid coagulates quickly. The effusion compresses the lung which is usually pushed upward and medially. It displaces the diaphragm downward and if large may displace the liver on the right side and the spleen on the left. Large effusions also displace the heart toward the opposite side of the effusion.

Symptoms.—Acute fibrinous pleurisy precedes the stage of effusion. Effusion is indicated when the pain decreases or disappears. The effused fluid separates and immobilizes both layers of the pleura. The temperature increases to 102 degrees or more, and the fever may be continued or remittent in type. Respirations are rapid and shallow. There is a dry non-productive cough. The patient tends to assume a lateral posture lying upon the affected side; however, dyspnea is not noticeable unless the effusion be extra large.

Physical examination will readily disclose the presence of effusion. Upon inspection it will be observed that the intercostal spaces bulge, the apex of the bulge usually being the eighth intercostal space in the scapular line. Vocal fremitus is absent over the effusion. Percussion reveals dullness over the effused fluid, but over the apex of the lung on the side of the effusion percussion will reveal hyperresonance. This is known as **skodaic resonance** and is due to the high tension of the tissue in the compressed lung. Auscultation reveals absence of breath sounds, diminished vocal resonance, and succussion sounds if any air be in the pleural cavity. X-ray of the effusion shows an opacity; this opacity is diffuse unless there is air in the pleural cavity. Air causes the fluid to become localized toward the base of the lung.

Diaphragmatic pleurisy is an inflammation of that portion of the pleura covering the superior surface of the diaphragm. It is characterized by deep-seated abdominal pain along the costal margin. The abdominal muscles are contracted. Usually there are dyspnea, pain, and sensations of smothering. When the phrenic nerve which supplies the diaphragm is affected, the pain may be referred into the upper shoulder or neck.

Interlobular pleurisy is a localized form in which the inflamed area lies between the lobes of the lung. Adhesions may form causing a retention of serum between the lobes. The condition then is sometimes called **encysted pleurisy.**

In pulmonary tuberculosis the pleura is commonly affected. Such cases have repeated attacks of pleurisy and often develop extensive adhesions between the parietal and visceral layers.

Purulent Pleurisy or Empyema

Definition.—The term purulent pleurisy is applied to those cases of pleurisy with effusion in which the cells undergo suppuration. Purulent pleurisy is secondary to other infections having pus-forming bacteria, such as pneumonia, tuberculosis, or septicemia.

Adjustment.—Same as fibrinous pleurisy.

Pathology.—When the suppurative stage of pleurisy has been attained, the pleura is greatly engorged and thickened, its surface being yellowish in color. The suppurative process may have extended into the lung, the pericardium, or the ribs and intercostal muscles. There is a tendency of the pus to perforate and be discharged through a bronchus, through a sinus in an intercostal space, or through the diaphragm into the abdomen.

Symptoms.—Purulent pleurisy may be considered as the tertiary stage of pleurisy; therefore, the symptoms of the fibrinous and serofibrinous stages precede those of empyema. The early stages may be relatively short during an acute in-

fection. The presence of suppuration is indicated by chills, high fever, and sweats. Heart action becomes very rapid and there is extreme weakness. There is a pronounced leukocytosis in all cases except tuberculous pleurisy. There may be delirium, stupor, and coma. Cough occurs as in the previous stage and is caused by lung irritation. Empyema of low virulence may exist for weeks or months, but the virulent cases are apt to develop pyemia if not properly drained.

Chronic Pleurisy

Recurrent attacks of fibrinous pleurisy tend to produce extensive adhesions. These adhesions are frequently the sequela to fractured ribs. Adhesions also form between the pleura and pericardium and between the pleura and diaphragm. The layer of fibrin forms a callus which undergoes organization. Thus the density of the adhesion varies with the amount of fibrin. Pleural adhesions limit movements of the thorax and therefore limit expansion in respiration.

The term chronic pleurisy also includes chronic effusions of inflammatory origin. The effusion may be encysted by adhesions; however, this condition is extremely rare.

Dry pleurisy causes intermittent attacks of pain which promptly subside when the affected side of the chest is immobilized. There is a decrease in the size of the thorax. There may be displacement of the heart, and a curvature of the spine develops. The opposite lung may become emphysematous if the respiratory impairment is extreme. Vocal fremitus is diminished on the affected side and percussion reveals impaired resonance. The breath sounds are vesicular in quality but greatly diminished in intensity.

Hydrothorax

Definition.—Hydrothorax is a noninflammatory effusion of fluid in the pleural cavity. It may be unilateral or bilateral.

Adjustment.—Adjustments should be directed toward the causative condition. Upper and lower dorsal should be included in all cases.

Symptoms.—Hydrothorax may become a part of the anasarca which develops in the congestive type of heart failure and diffuse nephritis. In these cases edema first develops in the lower extremities and in available loose subcutaneous tissue. The edema is progressive, ultimately causing effusions into the pericardium. The hydrothorax is a later development. In addition, hydrothorax may also develop during the course of constrictive paricarditis, also known as Pick's disease. The pericardium is greatly thickened by an overgrowth of fibrous tissue. Constricting adhesions impair heart action and venous drainage. It also may develop from venous obstruction due to other causes.

Diseases which cause hydrothorax are very debilitating, hence the onset of hydrothorax may remain unknown to the patient. The principal symptom is dyspnea which is somewhat relieved by assuming the erect posture.

Examination of the chest will reveal intercostal bulging, absence of vocal fremitus, dullness on percussion, diminished vocal resonance, and the absence of breath sounds. Skodaic resonance may be found in the apical area on the affected side. Upon aspiration the fluid is usually clear, coagulates slowly, and contains a very small amount of albumin and fibrin but few cells.

Pneumothorax

Definition.—Pneumothorax is a term applied to the presence of air in the pleural cavity. When air is associated with fluid, the condition is called **hydropneumothorax.** If pus and air coexist, it is named **pyopneumothorax.**

Adjustment.—Adjustments should include upper and lower dorsal areas of the spine.

Pathology.—The gases found in the pleural cavity may be oxygen, carbon dioxide, and nitrogen in the free state or combined in various proportions. Very often atmospheric air enters the pleural cavity through puncture of the visceral or parietal pleura. Air or gas in the pleural cavity will compress the lung yet prohibit collapse of the thoracic wall.

Symptoms.—More than one-half of the cases of pneumothorax are a development of pulmonary tuberculosis; therefore, the case history is subject to wide variations. The onset of the pneumothorax is abrupt. There is severe pain in the axilla, mammillary area, or scapular area with intense dyspnea and often cyanosis. The pulse is rapid and weak. The heart may be displaced. The shoulder of the affected side is elevated. The intercostal spaces are wide and bulging. Respiratory movement on the affected side is insignificant. Vocal fremitus is absent. The percussion tone is hyperresonant. The breath sounds are greatly diminished in intensity but are of a bronchial character due to the inactive state of the collapsed lung tissue. All cases of pneumothorax are in mental distress which results from fear of death. The pain gradually diminishes and in two or three weeks has entirely subsided. In so-called spontaneous pneumothorax which cannot be attributed to any specific cause, there is usually recovery. The prognosis of cases associated with tuberculosis must be based upon the tuberculosis and the physical condition of the patient.

CHAPTER X

PHYSICAL EXAMINATION OF THE CIRCULATORY SYSTEM

The Heart

The heart is a muscular organ situated in the mediastinum behind the sternum and between the lungs. It is divided into four cavities; the upper two are auricles and the lower two

ventricles. Venous blood enters the right auricle from the superior or inferior vena cava. Passing to the right ventricle, the blood goes through the right auriculoventricular orifice, which is guarded by the tricuspid valve. The pulmonary artery, which carries blood to the lung for æration, originates at the pulmonary orifice; this aperture is guarded by a valve with three segments, which is known as the right semilunar valve or the pulmonary valve. Aerated blood from the lungs enters the left auricle through four pulmonary veins. From here the blood enters the left ventricle, passing through the left auriculoventricular orifice, which has the mitral or bicuspid valve guarding the opening. The left ventricle forces the blood through the aortic orifice into the aorta. The aortic valve guards this aperture, has three segments, and is known as the left semilunar valve.

Position of the Heart

The Upper Border. The upper border of the heart is on a level with the upper border of the third costal cartilages, extending from a point one-half inch to the right of the sternum to a point one inch to the left of the sternum.

The Right Border. The right border of the heart is described by a curved line, the convexity of which extends toward the right, extending from a point one-half inch to the right of the sternum on the upper border of the third rib to the junction of the sternum with the sixth costal cartilage.

The Left Border. The left border of the heart is described by a slightly curved line, the convexity of which projects leftward from the upper border of the third rib, one inch to the left of the sternum, to the upper border of the sixth rib, one-half inch internal of the mammillary line.

The Inferior Border. The inferior border of the heart extends from the junction of the sternum with the sixth right costal cartilage to the upper border of the sixth left rib one-half inch internal of the mammillary line.

Mobility of the Heart

The heart is suspended in the pericardium by the roots of its great vessels; its base is fixed and is only displaced when the heart is subjected to unusual degrees of pressure. The apex of the heart, which is free, is capable of considerable alteration in position. When the patient lies upon the left side, the apex of the heart will move from one to two inches toward the left of its normal position. As the patient lies upon the right side, the apex moves toward the sternum as much as one inch. During a deep inspiration the apex of the heart moves downward with the diaphragm as much as two inches. In the supine position the apex beat may be imperceptible, and the heart sounds become difficult to hear because of the recession from the chest wall. As the body is inclined forward, the apex beat is increased in force and the heart sounds are more clearly audible.

The Cardiac Cycle

The heart is a muscular organ, and its function is to propel the blood to all parts of the body by a series of rhythmic contractions. As it is necessary for every organ to have periods of rest, the heart, even though considered to be constantly at work, has ample relaxation under normal conditions. Both of the auricles contract simultaneously as do the ventricles. A cardiac cycle consists of one complete act of the heart. If the pulse rate is 75, a cardiac cycle is complete in eight-tenths of a second. The contractions of the auricles lasts but one-tenth of a second, the remaining seven-tenths constituting their period of rest. The contraction of the ventricles follows immediately those of the auricles and lasts three-tenths of a second. The ventricles then rest five-tenths of a second. For convenience in diagnosis the cardiac cycle is described as follows:

Auricular systole one-tenth of a second; ventricular systole thee-tenths of a second; ventricular diastole four-tenths of a

second. It will be seen that the auricle is resting during the time that the ventricle is contracting and also the first four-tenths of a second that the ventricle rests; and the ventricle rests in addition to this four-tenths of a second, the one-tenth second that the auricle works.

Normal Heart Sounds

Normally there are two heart sounds. The first sound begins with the systole of the ventricles. It results from a series of vibrations arising from closure of the mitral and tricuspid valves, the contraction of the ventricles, and the movement of blood over the rough ventricle walls through the aortic and pulmonary openings. This sound has been named "Lubb" and is also called the muscular sound of the heart. This first sound lasts throughout the systole. It does not have an abrupt end and is described as being low pitched. It is best heard at the apex of the heart.

After the first sound there is a brief moment of quietness followed by the second sound. The second sound of the heart is caused by closure of the aortic and pulmonary valves. It is more abrupt than the first sound and is somewhat high pitched. It has been named "Dupp." The second heart sound is best heard at the base of the heart.

Accentuation of Heart Sounds

Under normal conditions the first sound of the heart is accentuated at the apex or in the mitral and tricuspid areas. The reason for this is that it has its origin in the contraction of the ventricles. These vibrations are naturally more forceful and more clearly audible when the stethoscope is placed directly over the seat of their origin.

The second sound of the heart is normally accentuated at the base or in the aortic and pulmonary areas. The reason for this is that the vibrations caused by the closure of the aortic and pulmonary valves are conducted by the aorta and

pulmonary arteries to these areas. The normal heart sounds may be modified under a variety of circumstances. Violent exercise, emotion, stimulants, and excessive eating increase the speed and force of the heart, causing all of its sounds to be intensified. Prolonged effort on the part of the right ventricle in chronic tuberculosis or fibroid pneumonia will cause its hypertrophy with a resulting accentuating of the first sound in the tricuspid area and the second sound in the pulmonary area. In the same manner prolonged overexertion of the left ventricle in cases of arterial hypertension will cause abnormal accentuation of the first sound in the mitral area and the second sound in the aortic area.

Methods of Examination

In addition to the case history which includes symptoms four methods of physical diagnosis are employed in examination of the heart. These methods are inspection, palpation, percussion, and auscultation.

Inspection

Inspection is employed to detect the area of visible cardiac pulsation, epigastric pulsation, and precordial bulging.

The Apex Beat

The wall of the left ventricle forms the apex of the heart and is spoken of as the anatomical apex. The wall of the right ventricle lies in contact with the anterior thoracic wall, and with each systole its apex is pressed more firmly against the thoracic wall producing the so-called apex beat or cardiac impulse. For this reason the apex of the right ventricle is called the clinical apex. Normally the apex beat produces a visible pulsation over an area, the diameter of which is about one inch. This area is situated in the fifth intercostal space about one-half inch internal of the mammillary line. This visible impulse is more intensive when the heart is acting rap-

idly and forcibly. It is less extensive in the recumbent posture. The visible impulse may be absent when the clinical apex lies behind a rib, the chest wall is excessively thick, or the heart muscle is extremely feeble. In cases of emphysema more of the heart may be covered, and a portion of the lung may be interposed between the apex of the heart and the thoracic wall. This may cause an absence of the apex beat. In a similar manner an effusion into the pericardium also may cause absence of the apex beat.

Displacement of Apex Beat

The apex beat may be displaced upward because of a high position of the diaphragm due to tympanites, ascites, abdominal growths, or distention of the stomach. Occasionally effusions into the pericardium not only cause the apex beat to be invisible but also displace the heart upward.

The apex beat may be displaced downward by the pressure of an aneurysm in the arch of the aorta or by a mediastinal tumor. Likewise general prolapses of the abdominal viscera with a downward displacement of the diaphragm bring the apex below its normal position. Hypertrophy of the left ventricle displaces the apex beat downward and to the left.

The apex beat may be displaced to the left or right by unilateral emphysema, a tumor of a lung or pleura, an effusion of gas or fluid, and a change in posture.

The area and force of the apex beat may be increased by overactivity of the heart muscle, hypertrophy and dilatation of the heart, or retraction of the left lung.

Epigastric Pulsation

Epigastric pulsation is a visible or a palpable pulsation in the epigastric region. It may be systolic or postsystolic in time, which is determined by placing one hand upon the pulsating epigastrium and the other hand on the apex beat of the heart. If the impulses in each region coincide, the pulsation

is said to be systolic in time. Systolic epigastric pulsation is a direct result of a forceful or overactive heart. It is especially common in hypertrophy and dilatation of the right ventricle and is also found when the apex beat is displaced to the right. Overactivity of the heart may be due to fever, valvular defects, toxic goiter, or anemia. Postsystolic epigastric pulsation is due to the expansion of the aorta. It is commonly seen in neurotic individuals and those suffering from gastric disorders. Upon deep abdominal palpation in those having thin abdominal walls the pulsating aorta is distinctly palpable. Neurotic patients discovering this often become concerned about the cause of the pulsation. Their mind is usually relieved when it is explained that this is merely the pulse in the aorta.

Precordial Bulging

Precordial bulging is most commonly encountered in children and women having thin flexible thoracic walls. The most common cause of precordial bulging is enlargement of the heart. The enlargement may be in the form of hypertrophy or dilatation, either of which is the result of prolonged overexertion. Men who have congenital heart lesions or defects produced early in life may also have precordial bulging. In the majority of instances precordial bulging due to enlargement of the heart is found between the third and seventh ribs and between the left border of the sternum and the mammillary line. Immense hypertrophy of the right ventricle in children may cause a marked bulging of the entire sternum and the sternal ends of the ribs on both sides. In adults having a cor bovinum the bulging may extend far beyond the mammillary line.

Effusions into the pericardium are usually temporary and cause temporary precordial bulging. As a result the bulging is more pronounced in the intercostal spaces in these cases. The bulging from pleural effusions extend beyond the pre-

cordium and are more commonly lateral. These conditions are discoverable by inspection supplemented by palpation and percussion.

Precordial Retraction

Retraction in the precordial region during inspiration is indicative of pericardial adhesions or pleural adhesions near the apex of the heart. Retraction of the entire left side is commonly observed in atelectasis, fibroid pneumonia, fibroid phthisis, and other conditions producing collapse of the left lung. In these cases, however, the retraction is not confined to the precordial area.

Palpation

Palpation is used in examination of the heart to detect thrills, to detect points of tenderness, to examine the condition of related organs, to locate specifically the apex beat, to observe the cardiac rhythm, to study the size of the heart, to detect extracardiac pulsation, and to examine the arteries and veins.

A thrill is a palpable vibration of cardiac origin. Thrills vary in intensity from the finest vibration, which is barely palpable, to forceful vibration of which the patient is continuously conscious. Pronounced thrills may be discoverable over a large area of the thorax, but all of them have a point of maximum intensity. These abnormal vibrations have their origin at the valves of the heart and are conducted by the heart muscle and by the blood stream. It should be readily seen that the point of maximum intensity will be the valvular area corresponding to the valve at which the vibration has its origin. Thrills are described as being systolic and diastolic. Those occurring in mitral and tricuspid stenosis are described as being presystolic, that is, they occur at the end of the diastole and immediately before the systole of the ventricles. Mitral thrills are discoverable at the apex beat, in the axillary line, or often anywhere between these two points. In mitral

stenosis the thrill is presystolic in time, while in mitral incompetency the thrill is systolic in time. Thrills originating at the tricuspid valve are palpable along the right border of the lower fourth of the sternum. Aortic thrills are best detected between the second and third ribs at the right border of the sternum; and if the heart is acting forcefully, these thrills may be transmitted throughout the entire length of the sternum. Thrills originating at the pulmonary valve are palpable at the second left intercostal space. Thrills have their origin at the same point and in the same manner as murmurs; but the murmur is what you hear—the thrill is what you feel.

Tenderness—It is common in most diseases to find superficial tenderness in the area overlying the affected organ. By careful palpation this tenderness is traceable to the intervertebral foramina. Tenderness at the intervertebral foramen indicates nerve irritation, a condition resulting from minute disrelation or subluxation of an adjacent segment. The detection and location of this tenderness is of prime importance to the Chiropractor, because it leads him to the physical cause of the incoordination.

Related organs—The normal condition of many organs is dependent upon normal heart action. The heart pumps blood to all parts of the body, carrying nutritive material in its serum and oxygen in its cells, both of which are necessary to normal nutrition. The venous blood carries toxic material and metabolic waste from the tissues. These poisons in turn are carried by the blood stream to the various excretory organs. Failure on the part of the heart to perform its work permits toxins to act upon the walls of the capillaries and veins. This results in a condition of venous stasis characterized by edema. The edema is plainly visible in the lower extremities during the period of lost compensation or cardiac dilatation. Similar effects in the abdominal organs must be detected by palpation. In tricuspid disease drainage through the inferior vena cava is greatly resisted, resulting in edema of the abdominal organs as well as of the lower extremities.

In such cases the liver is palpably enlarged and not uncommonly will be found to pulsate. Similarly, pulsation may be detected in the jugular veins which in tricuspid stenosis will be observed to be presystolic in time. Systolic pulsation of the jugular veins suggests tricuspid incompetency of marked degree.

Size of the heart as judged by the apex beat—In many cases the apex beat is not visible, yet it is palpable. Its location is of considerable importance in estimating the size of the heart. If it is remembered that the base of the heart is fixed at the level of the third rib, it can be readily seen that enlargement of the heart causes displacement of the apex beat. Therefore, the length of the heart is the distance from the upper border of the third ribs to the apex beat. For all practical purposes this is the easiest and simplest method of determining the approximate size of this important organ.

Extracardiac pulsation is pulsation beyond the limits of the heart. Pulsation in the right supraclavicular space is found in aneurysm of the innominate and the right carotid arteries. In marked hypertrophy of the left ventricle as well as in overactivity of the heart resulting from fever, goiter, high blood pressure, or emotion, pulsations are palpable and frequently visible at the root of the neck. Aneurysm of the arch of the arota may cause pulsation in the upper intercostal spaces, especially to the right of the sternum, while dilatation of the abdominal aorta produces pulsation in the epigastric or umbilical regions. Systolic pulsation of the liver is suggestive of tricuspid incompetency.

All of the diagnostic criteria thus gained through palpation should be carefully considered in connection with the symptoms and other physical findings before any definite conclusion is made.

The Pulse

During each systole of the ventricles three ounces of blood is pumped from the heart into the arterial system, which is

already well filled. This increases the pressure within the arteries and causes them to expand with each contraction of the ventricle. This periodic expansion of the arteries is called the pulse. The arterial pulse indicates the frequency, regularity, and force of the heart's action.

For convenience the radial artery is most commonly used to obtain clinical information regarding the pulse. For examination of the pulse the patient should be in a sitting or recumbent posture, the forearm flexed, and the hand semiprone. The first three fingers should be placed over the radial artery with the forefinger nearest the hand. In this examination of the pulse there are four important points to be determined, namely: size, rate, rhythm, and force.

To determine the pulse rate the pulsations should be counted for fifteen seconds and multiplied by four to give the rate per minute. When the pulse is very rapid and irregular, it will be more accurate to count the pulsations for one full minute. When eight-tenths of a second is occupied by the cardiac cycle, the pulse rate will be 75 per minute. This is given as the average normal pulse rate. As a rule the rate is slightly more rapid in women than in men and varies from 60 to 90 without any evidence of cardiac abnormality.

The pulse rate is by no means the all-important feature to be observed in pulse taking. The size of the pulse, its rhythm, and its force are equally important to cardiac efficiency. It is not uncommon to encounter a pulse rate of 50 or 100 in which the cardiac muscle is efficient, yet a pulse of 75 of small size or poor rhythm may be encountered in a failing heart. The size, rhythm, and force are more or less simultaneously noted. Observe whether the pulsations are large or small, regular or irregular in time, easily compressible or noncompressible. If the pulsations are small and irregular in time and easily compressed by light or moderate pressure, the heart's contractions are weak. If the pulse waves are large and regular, and if the artery walls remain round

and are palpable between the pulsations; the heart is strong and forceful.

Intermittent pulse indicates inefficient systoles or absent systoles. In a failing heart muscle with pronounced mitral regurgitation it is common to note contraction on the part of the ventricles without the production of the pulse wave. In most cases of dilatation of the heart there is incomplete contraction which fails to produce a pulse wave. Occasionally intermittent pulse is observed in nervous individuals or during pregnancy and apparently has no significance. In the main, intermittent pulse suggests a weak heart muscle suffering from want of vital energy which is so essential to its normal performance.

Irregular pulse is one in which the time and force of the pulsations are unequal. An irregular pulse may or may not be intermittent. Its chief indication is a weak or failing heart muscle.

Pulsus magnus is a large pulse such as is encountered in hypertrophy of the heart from any cause.

Pulsus parvus is a small pulse. It is characteristic of aortic stenosis.

Pulsus tardus is also called the slow or tardy pulse. These terms relate to the rise and fall of the pulse wave and not to the rate. This is the characteristic pulse of arteriosclerosis and old age.

Corrigan's pulse is also called the shot pulse and the waterhammer pulse. It is the characteristic pulse of aortic incompetency. The pulse wave has a rapid and pronounced rise, after which it suddenly falls from the finger. The sudden recession is caused by the sudden decline in the diastolic pressure permitted by regurgitation into the left ventricle.

The dicrotic pulse. The normal pulse is faintly dicrotic. In fevers of high degree and of prolonged duration the second wave becomes markedly pronounced and may be pal-

pable. When palpable, it occurs as a secondary tap immediately following the primary wave. It can only be detected upon very light pressure and with highly sensitive fingers.

Capillary pulse occurs in marked hypertrophy of the heart, especially when aortic regurgitation coexists. It is best detected by rendering the tip of the finger nail anemic with pressure on the tip of the nail and observing a rhythmical increase in the area of redness. It may also be detected by everting the lower lip and rendering a portion of the mucous membrane anemic with pressure by a piece of clear glass. It will be observed that the anemic area diminishes in size with each pulsation of the heart.

Percussion

Percussion is used in examination of the heart to determine its size and position. Inasmuch as a portion of the heart is covered by the lung, the percussion note is not of the same quality over its entire area. In percussion of that area of the heart not covered by lung, the percussion note is distinctively dull. This area is known as the area of absolute dullness or the area of exposed dullness. The percussion note over the base of the heart and the lateral borders is modified by that portion of lung projecting between it and the thoracic wall. This area of modified dullness is known as the area of relative dullness or covered dullness.

For clinical purposes percussion of the heart is of little value. The information obtainable by percussion is more easily obtained by palpation and inspection. With the knowledge that the base of the heart remains in a constant position on a level with the upper border of the third rib, it is easy to determine the length of the heart by merely measuring the distance from the upper border of this third rib to the left border of the apex beat. The only exception to this occurs when the heart is displaced by growths or aneurysm which crowd it from its normal suspended position. When percus-

sion of the heart is used, its greatest value lies in determining the condition of that portion of the lung overlying the heart and in detecting effusions into the pericardium and pleura.

Two methods of percussion commonly employed in determining the area of cardiac dullness are finger percussion and orthopercussion. In locating the borders of the heart, the examiner will find it best to work inward or from the lung tissue resonance to cardiac dullness. Placing marks on the skin with a skin pencil at the point at which the dullness has been established will ultimately reveal the outline of the heart; this necessitates locating the upper border and right and left borders, the inferior border being difficult to designate as hepatic dullness is continuous with the cardiac dullness at this point.

Auscultation

Auscultation is used in examination of the heart in determining the condition of the heart muscle, the condition of its valves, the increase or decrease of arterial tension, the condition of the lung resulting from cardiac defects, and to some extent the condition of the blood and the membranes around the heart.

It is highly important that the student become familiar with the normal heart sounds and their variations before making any attempt to determine abnormal heart sounds. It is likewise important to have a thorough understanding of the structure and action of the normal heart. In auscultation of the heart the normal sounds are of first importance rather than a suspected abnormal sound.

The first sound of the heart is produced by the contraction of the ventricles and the closure of the auriculoventricular valves. These vibrations are conducted by the heart muscles to the thoracic wall. The first sound is systolic in time; hence, it occurs with the apex beat and with the rise of the carotid pulse wave. The vibrations constituting this sound arise from the ventricle walls; consequently, they are accentuated and

clearly audible when the stethoscope is placed at any point directly over the wall of the right ventricle or the apex of the left ventricle.

The second sound of the heart is caused by closure of the aortic and pulmonary valves and occurs immediately following the systole of the ventricles. It is normally accentuated at the base of the heart or over the aorta and pulmonary arteries. The vibrations arising from the closure of these valves are conducted by the aorta and pulmonary artery; and since they lie nearer the thorax at the second intercostal space on each side of the sternum, the accentuation of the second sound is at these two points.

The Valvular Areas

The valvular areas are also called the auscultation areas. They are the points upon the anterior thoracic wall at which the heart sounds are most clearly audible. The valves of the heart lie so close to one another that a silver dollar placed near the middle of the sternum would overlie all of them. Auscultation at this point would yield a confusion of sounds of little value. Vibrations originating at the valves of the heart are transmitted by the blood and by the heart muscle, consequently the valvular areas are located at points as remote from the origin of the vibration as it is possible to hear them clearly. In the valvular areas the valvular sounds are clear and can be studied without the interference of coexisting and unrelated sounds.

The mitral area is located at the apex beat of the heart. Normally this is in the fifth intercostal space one-half inch internal of the mammillary line.

The aortic area is located at the second right intercostal space near the margin of the sternum. In some cases aortic sounds are more clearly heard at the fourth left costal cartilage.

The tricuspid area is located between the fourth and sixth ribs along the right border of the sternum directly over the wall of the right ventricle.

The pulmonary area is located in the second left intercostal space near the margin of the sternum.

Murmurs

A murmur is an abnormal heart sound. Murmurs are classified as frictional or pericardial, functional or hemic, and organic or valvular.

A **frictional or pericardial** murmur is a friction sound of a rasping or scraping character due to the friction of inflamed pericardial surfaces. These sounds are always localized and not transmitted. They are, as a rule, most clearly heard during expiration when the expiration is maintained for a few moments. Firm pressure upon the stethoscope intensifies them, and they are usually heard between the second and fourth ribs along the left side of the sternum. As the inflammation may spread and the character of the exudate change, their tone and intensity may be altered from day to day.

It is often necessary to have the patient lean forward in order to detect their existence. They are usually systolic in time, but occasionally they are double and produce a scratching sound similar to that produced by pulling apart two pieces of adhesive tape. Neither disturbances in the circulation nor signs of hypertrophy or dilatating of the heart accompany these abnormal sounds.

Functional or hemic murmurs occur in anemia. It is believed their origin is due to changes in the consistency of the blood, together with a lowered blood pressure. When the blood from the ventricles enters the aorta and pulmonary arteries, having a low viscosity, it is thrown into whorls causing vibrations that constitute this murmur. They are always systolic in time and of a low, soft, blowing pitch. They are best heard at the

pulmonary area, especially in subjects under 30 years of age. Functional murmurs are not transmitted in any direction, nor is there any palpable thrill. Except in long standing cases there are no signs of cardiac enlargement. These murmurs are transient and are not present with every systole. They disappear with recovery from the anemia.

Organic or valvular murmurs are abnormal sounds of the heart due to defects at the valves or the orifices they guard. These murmurs arise from two conditions, stenosis or obstruction of the orifice and incompetency or insufficiency of the valve which permits regurgitation. The tone of the murmur depends upon the consistency of the blood, the force of the contraction of the heart, the physical state of the tissue set in vibration, and other factors. The more forceful the contraction of the heart, the more forceful will be the vibrations set up during its contraction. It may be generally said that a loud murmur suggests a strong heart and a favorable prognosis, while a faint murmur suggests a weak heart and a cautious prognosis. Inasmuch as the tone of a murmur depends upon the physical state of the vibrating tissue and the force of the heart's contraction which sets it in vibration, it is impossible to determine the nature of valvular defects by the tone produced. The following terms suggest varying tones that may be encountered: soft, low pitched, sharp, shrill, high pitched, blowing, sighing, cooing, gurgling, whistling, hissing, sawing, grating, musical, squeaking, blubbering, roaring, and rumbling. It cannot be said that any one or combination of these qualities suggests either incompetency or stenosis. Murmurs are classified as systolic, diastolic, and presystolic.

Systolic murmur is an abnormal heart sound which occurs during the systole of the ventricle. It occurs

With the apex beat.

With first sound of the heart.

With rise in pulse wave.

Diastolic murmur is an abnormal heart sound which occurs during the diastole of the ventricles. It occurs

Between apex beats.

After the first sound.

With the fall of the carotid pulse wave.

Presystolic murmur is one which occurs during the last part of the diastole and immediately before the systole of the ventricles. Presystolic murmurs are found in mitral and tricuspid stenosis only. In these two diseases auricular fibrillation usually arises and tends to increase the intra-auricular pressure and is responsible for these murmurs becoming diastolic. Organic murmurs of the heart may accompany, modify, or completely replace the normal heart sounds.

Detecting the Murmur

Auscultation of the heart should be made with the patient in the erect posture and in the recumbent posture, and frequently it is advisable to have the patient exercise for a few minutes in order to clarify the significance of feeble abnormal sounds. The examiner should always look for the normal heart sounds; namely, Lubb-Dupp. No conclusion should be reached before all facts are ascertained; and if this be kept in mind, the examiner will be less likely to look for suspected sounds.

All murmurs are heard loudest at one point—the point of maximum intensity. This point is usually the valvular area corresponding to the defective valve. Most murmurs can be heard in some one direction leading from the point of maximum intensity. This direction depends upon the conductivity of the structures to which the vibrations are transmitted. The walls of the heart, the sternum, and the great vessels are good conductors. It is for this reason that the murmur of aortic incompetency may be heard along the entire sternum and the murmur of aortic stenosis transmitted to the root of the neck by the aorta.

With the patient breathing quietly each of the valvular areas should be examined carefully and thoughtfully. At each area listen for the normal sounds, Lubb-Dupp. Begin at the mitral area, then the aortic, then the tricuspid, and lastly the pulmonary. If a systolic murmur exists, it may modify, totally replace, or accompany the first sound, hence the necessity for familiarity with the variations of the first sound. When the first sound is so obscure that the murmur cannot be properly timed by its occurrence, the fingers of the free hand can be placed at the apex beat or upon the carotid pulse. If the murmur occurs with the beat or with the rise of the carotid pulse wave, it is systolic in time. If the murmur occurs after the first sound or between the apex beats or with the fall in the carotid pulse wave, it is diastolic in time. The stethoscope should be moved in all directions from the point at which the murmur was first discovered until the point of maximum intensity is discovered. After the point of maximum intensity has been discovered and the time of the murmur is ascertained, the valvular defect is determined by recalling the physiology of the heart.

Mitral Murmurs

A systolic murmur in the mitral area is usually loudest at the apex beat and may be transmitted to the left axillary line between the fourth and eighth ribs. If accompanied by displacement of the apex beat toward the left or associated with other signs of hypertrophy or dilatation, it indicates mitral regurgitation. During the systole of the ventricles the normal mitral valve is closed, and no vibrations arise at that point. The only organic defects that would permit a murmur arising at this orifice during the systole would be mitral incompetency or insufficiency. Systolic murmurs in the mitral area are usually soft and low pitched, but this tone depends upon the state and texture of the tissues set in vibration by the regurgitating blood. Loud murmurs are associated with a thrill

or palpable vibration which can be best detected at the point of maximum intensity of the murmur.

The terms mitral insufficiency, incompetency, and regurgitation are by custom used synonymously. Valvular insufficiency means that the orifice which a valve guards has been enlarged, and the normal valve segments are insufficient. Valvular incompetency is the result of inflammatory or degenerative disease which has roughened or altered the shape of the valve segments. They no longer fit perfectly and permit regurgitation of blood. Regurgitation is the backward flow of blood; it is permitted by both valvular incompetency and valvular insufficiency.

Presystolic mitral murmurs denote mitral stenosis. They are of feeble intensity and are localized. Should auricular fibrillation develop in mitral stenosis, the presystolic murmur may become prolonged, occupying the diastole. It is then known as the diastolic murmur.

Diastolic mitral murmurs are best heard at the apex beat and are usually localized within a narrow radius. They are usually sharp, shrill, and high pitched. The cause of these murmurs is the contraction of the left auricle forcing blood through the narrow mitral orifice.

Aortic Murmurs

A systolic murmur indicates aortic stenosis. The vibrations arise at the aortic valve during the systole of the left ventricle and are carried by the blood stream throughout the upper aorta and its branches; therefore, the murmur is localized at the aortic area but may be transmitted upward to the carotids. It coincides with the first sound of the heart and frequently replaces it. If the valve segments are stiff and fail to close properly, there will be no second sound. The absence of the second sound is further due to the fact that the arterial tension is low. Systolic murmurs in the upper part of the thorax, including the aortic area, may also be produced by

aneurysm of the aorta, growths pressing upon the aorta, and a roughening or thickening of the tunica intima; therefore, before it is concluded that a systolic murmur in this area indicates aortic stenosis, it should be further substantiated by signs of hypertrophy or dilatation of the left ventricle.

A diastolic murmur in the aortic area indicates aortic incompetency. It begins with the second sound and frequently replaces it. The point of maximum intensity may be at the second right intercostal space or in the vicinity of the fourth rib to the left of the sternum. This murmur is transmitted throughout the entire length of the sternum and frequently over the entire exposed cardiac area. Aortic incompetency is always associated with hypertrophy or dilatation and has Corrigan's pulse and a high pulse pressure. The large aortic pulse causes the aorta at the apex of the pulse wave to press upon the sternum. Bone being a good conductor of vibration causes these vibrations to be carried along the sternum and the sternal end of the ribs. In cases having marked hypertrophy of the left ventricle the murmur is audible over a larger area. It is then necessary to note with care the point of maximum intensity in order to locate its source. It is possible to have aortic regurgitation without any murmur, and measuring blood pressure affords the best method of detecting the condition when such is the case. It is not uncommon to find systolic pressure 150 and diastolic pressure of 50 or even as low as 10 in such cases.

Tricuspid Murmurs

A systolic murmur in the tricuspid area indicates tricuspid regurgitation. The point of maximum intensity is along the right border of the lower portion of the sternum. It may be transmitted somewhat to the right and also upward along that part of the sternum overlying the wall of the right ventricle. It is sometimes the result of endocarditis, which has deformed the valve segments but is more often a result of right ventricular dilatation. If this murmur is present, the

liver is apt to be enlarged and will pulsate. The jugular veins are also distended and jugular pulsation is frequently noted.

A presystolic murmur in the tricuspid area indicates tricuspid stenosis. The murmur is feeble but high pitched. It is heard along the right border of the ensiform cartilage. It is not transmitted. When auricular fibrillation develops, the duration of the murmur is prolonged and may then be called a diastolic murmur.

Pulmonary Murmurs

A systolic murmur in the pulmonary area indicates pulmonary stenosis which may be congenital or acquired. Pulmonary stenosis is the most common congenial valvular defect of the heart. When the condition is present, the murmur is diffuse over a large area along the left border of the sternum. It is associated with cyanosis and clubbing of the fingers. Congenital pulmonary stenosis may be associated with a patent foramen ovale or ductus arteriosis. In such an event there is a confusion of sounds, but standing out clear and above all others is the systolic pulmonary murmur. It is very rare that pulmonary stenosis results from endocarditis, but it is sometimes acquired by the shrinking of the left lung following pneumonia, which causes a traction and narrowing of the pulmonary artery. Hemic murmurs are usually heard in this pulmonary area and are systolic in time, but they are usually transient and disappear as the anemia improves.

Diastolic murmur in the pulmonary area indicates pulmonary regurgitation. This murmur is rare. It is best heard in the pulmonary area and may be transmitted along the left border of the sternum toward the superior a short distance.

Combined Murmurs

Two or more valvular defects may coexist. In such an event there may be two or more murmurs. A valvular orifice may be obstructed, and at the same time its valvular segments

may be rendered incompetent; or two separate valves may be defective. In the buttonhole mitral valve stenosis and incompetency exist, giving rise to a presystolic and a systolic murmur; likewise the aortic valve may become stiffened and roughened so that it presents obstruction and permits regurgitation. With such a deformity at the aortic valve it would be possible to hear a systolic and a diastolic murmur which may completely obscure both normal heart sounds in the aortic area.

The most common combined valvular defect is aortic stenosis and mitral regurgitation, in which there would be a systolic murmur in the aortic area and a systolic murmur at the apex beat. In aortic stenosis and regurgitation and mitral regurgitation there would be a systolic murmur in the aortic area and in the mitral area and also a diastolic murmur in the aortic area. The detection of organic valvular defects depends upon locating and timing the murmurs and detecting symptoms and physical signs of enlargement of the heart.

Compensation

Valvular defects interfere with the circulation of blood. In order to maintain circulation as near normal as possible under such circumstances, the heart muscles undergoes an adaptive hypertrophy to meet the increased work thrown upon it. In this type of hypertrophy the cavities are enlarged and the heart wall surrounding them is thickened. This increased development of the heart enables it to overcome interference and maintain adequate circulation. As long as the increased strength of this thickened muscle serves to maintain a normal circulation, there will be no marked symptoms. Hypertrophy compensates for the valvular defects. If, however, the heart muscle should fail under this overwork, the muscle fibers will stretch and the heart dilate. Compensation is then ruptured or broken. Broken compensation is equivalent to dilatation of the heart. The three cardinal symptoms of a failing heart are

fatigue upon slight exertion, breathlessness, and pain. In addition to these symptoms there may be vertigo, tinnitus, cyanosis, coldness, numbness, and edema of the lower extremities. This edema is called cardiac edema. It is the result of the inability of the heart muscle to put sufficient force behind the circulation to return the blood through the veins against the resistance offered by gravity.

Cardiac compensation depends upon normal innervation of the heart muscle and avoidance of anything that puts a strain upon the heart. Vertebral subluxations that impinge nerves supplying the heart tend to shorten the duration of compensation or even prevent it developing. The first results obtained by Chiropractic adjustments are due to a restoration of compensation resulting from freeing the impinged nerves supplying the heart muscle. With compensation a heart having defective valves may serve its owner many years, a fact which explains the longevity of many people having valvular defects. The ability of the heart to perform its work is more important than the presence or absence of valvular defects; therefore, too much stress should not be placed upon murmurs, and greater importance should be attached to the condition of the heart muscle. The size, rate, and rhythm of the pulse, the blood pressure, the endurance, and other symptoms serve to give us information by which we are able to judge heart strength.

A cardiac case should not be judged in terms of the valves as is so commonly done but in terms of the heart muscles. Weakness of the heart is due to disease of this muscle. Exhaustion of the muscle acts as a cause of failure and may be the result of overwork of the muscle resulting from damaged valves. In early cardiac failure there may be no symptoms when the body is at rest. The patient's exercise tolerance will be reduced in proportion to the degree of failure present. The important thing to know is the amount of work which may be undertaken to produce distress. No patient who has a normal exercise tolerance has grave heart disease. Ex-

ercise tolerance varies with different individuals: those leading active lives have a better tolerance than those leading sedentary lives. Tolerance to effort can usually be judged from the patient's history. Is distress produced by walking on the level, climbing one flight of stairs, walking up hill? If in doubt, any simple exercise such as hopping, lifting dumb bells, or running in space may be used. The exercise tolerance may be said to be reduced if there is undue breathlessness, exhaustion, or pain incurred as a result of effort. To prevent misunderstanding it may be stated that pain in the cardiac region may vary from a feeling of substernal pressure to the most agonizing distress. Some patients having chronic heart disease have little or no pain; on the other hand pain is not uncommon in the cardiac region in individuals who present no signs of heart disease. In this latter type the individual is generally young, high-strung and frequently the subject of a neurosis.

Important Points

Cardiac failure is the condition in which the heart is unable to maintain an efficient circulation when it is expected to meet efforts necessary to the daily life of the individual.

The chief object in any cardiovascular examination should be the determination of the presence or absence of cardiac failure.

Myocardial disease is the cause of cardiac failure in the majority of cases.

The early evidences of an impaired circulation are to be determined from the patient and are the symptoms of distress produced by exertion. The chief symptoms are fatigue, breathlessness, and pain.

The response to effort is the sole guide in the detection of the early signs of cardiac failure.

The two main types of cardiac failure are:

1. Cardiac failure of the congestive type.
2. Cardiac failure of the anginal type.

The chief early signs and symptoms of cardiac failure of the congestive type are:

Fatigue, breathlessness upon exertion, pain, engorgement of the veins of the neck, and enlargement of the liver.

The chief and sometimes the only feature of cardiac failure of the anginal type is pain.

Cardiac pain in chronic heart disease is evidence of myocarditis. Pain is a symptom and not a disease.

The most common underlying pathological lesions found in anginal failure are:

1. Coronary sclerosis.
2. Aortitis (particularly syphilitic).
3. Coronary thrombosis.
4. Coronary embolism.

Anginal failure is of serious prognostic significance, as sudden death is not uncommon.

All failures of the circulation are not necessarily heart failures. Circulatory failure in the infectious disease may be caused by a stagnation of blood in the systemic veins and capillaries.

"Symptoms in cardiovascular affections are of more importance than physical signs in forming a prognosis. The question is, 'What is the heart capable of doing under conditions of rest and exercise?' rather than what sort of noises it produces." (Sutherland.)

CHAPTER XI

BLOOD PRESSURE

Blood pressure is the result of two forces in the vascular system; these are identified as the propelling and the resisting forces. The normal heart contracts 75 times per minute and with each contraction forces about three ounces of blood into an already well-filled arterial system. The increase of pressure by the blood upon the arterial walls induces their stretching; the alternating expansion and subsequent contraction of the

artery walls is known as the pulse. The pressure caused by the intermittent contractions of the heart is the **propelling force.**

To have pressure there must be a meeting of two opposing forces; consequently, the propelling force must have resistance. In the arterial system this is offered by the diminishing diameter of vessels leading from the heart, the elasticity of the walls, and the continuously well-filled arteries. The resistance offered against further distention of the elastic walls by the forcing of three additional ounces of blood into the arteries is the **resisting force.**

Blood pressure, therefore, is produced by the heart pumping blood into the tapering, elastic, and consequently resistant arteries. The mutual pressure of blood and artery upon each other is measured. The alternate increase and decrease of the pressure is due to the intermittent flow from the heart.

Systolic Pressure

The maximal pressure corresponds with the contraction of the ventricles and is known as the systolic pressure. This measure of the propelling force of the circulation is an indication of the **gross heart strength.**

Diastolic Pressure

The minimal pressure coincides with the diastole of the cardiac cycle and accordingly is known as the diastolic pressure. The measurement of this resisting force also denotes the elasticity or stiffness of the artery walls. Both systolic and diastolic pressures are expressed in millimeters.

Pulse Pressure

The pulse pressure is the difference between the systolic and the diastolic pressures. It indicates the **reserve heart strength** or the **net heart strength** which is the excess force in addition to that required to meet arterial resistance.

Normal Pressures

Faught's formula for approximate normal male systolic pressure is: Up to the age of 20 add 100 to the age. After twenty add one millimeter for every two years the individual is over twenty. In women the systolic pressure is usually ten millimeters lower than in men.

Normal systolic pressures vary from 110 to 140.

Normal diastolic pressures vary from 70 to 100.

Normal pulse pressures vary from 35 to 50.

In health there are slight variations in blood pressure that depend upon age, sex, physical activity, posture, and habits of the patient. The blood pressure is slightly lower when the patient is in the horizontal posture. It is slightly increased upon sitting erect and increased somewhat further when standing. These variations in health are very slight.

Physiological Causes of Rise in Blood Pressure

There are four things which increase the systolic pressure in a natural way. They are **exercise, emotions, stimulants,** and **food.** Some articles ingested, such as coffee, are always stimulative; and all food has a stimulative effect when eaten by one who is starving. Normal activity is a form of exercise; and all humanity is more or less emotional. These conditions raise the blood pressure by increasing the rate of the heart or slightly increasing the tension of the arteries. Their effect is temporary; therefore, higher blood pressure is not indicative of abnormality unless it is persistent.

Pathological Causes of Rise in Blood Pressure

Abnormal blood pressure is persistent; it does not vary greatly from day to day nor at different times in the day. High blood pressure is caused in two ways; namely,

1. Sclerosis of the arteries.
2. Hypertension of the arteries.

Sclerosis of the Arteries

Arteriosclerosis may result from infectious and toxic diseases, or it may be preceded by hypertension. The lumen of the artery is diminished by a thickening of its wall. At a later period this thickened wall may be the site of calcareous deposits which further destroy elasticity. Arteriosclerosis develops in advanced syphilis, interstitial nephritis, alcoholism, lithemic diseases, and old age. Structural changes developing in the arterial system tend to spread to and involve the heart. Structural damage of the heart muscles weakens the circulatory pump and thereby limits the extent to which the systolic pressure can be raised. Occasionally high systolic pressures are encountered in arteriosclerosis, but more often the systolic pressure is less than 170. The continued development of fibroid, fatty, and other changes in the heart muscle may permit the blood pressure to become subnormal even in the presence of sclerosed arteries.

Hypertension of Arteries

Hypertension means that the arterial walls are contracted or abnormally tense. Their lumina are smaller, and more force is required to stretch them. Hypertension may be caused by the action of toxic substances in the blood stream which irritate and injure the delicate nerve endings. Pain, intracranial pressure, meningitis, and encephalitis induce a rise in the blood pressure which is due to hypertension. A hypertonic state of arteries or arterioles throughout the body is a state of hypertension that may occur exclusively from nerve irritation. These cases are classified as being of nervous origin.

High blood pressure due to hypertension is most commonly found in nephritis but also occurs in diabetes mellitus, increased intracranial pressure, toxic thyroid, angina pectoris, and impending uremia. When the systolic pressure is persis-

tently 180 or over, it is believed to be due to an impermeable kidney. The function of the kidney may become subnormal long before the kidney structure begins to deteriorate and break down. Hence, urine examinations do not disclose the nature of a failing kidney in its early stages.

The heart is an adaptive organ whose activity is increased when necessary to meet the body's demand for blood. When hypertension or sclerosis of the arteries develops, the increased activity on the part of the heart brings about compensatory hypertrophy. Thus when the resisting force in the circulation is increased, the propelling force is adaptively increased, explaining the rise in both systolic and diastolic pressures.

Hypertension which occurs in early or middle life in the absence of discoverable disease has been named **essential hypertension.** In these cases an elevation in blood pressure may be the only abnormality that can be discovered. It affects both sexes and people of all build but predominates in those inclined to be fleshy. It is also more common among men who live under high tension and work under pressure. The peripheral arteries in all parts of the body are contracted. These include those of the kidney which may well occur in advance of vascular spasm elsewhere. Restriction of flow of blood through the kidney would impair proper filtration of the blood and elimination of toxic substances. Interference with the flow of vasodilating impulses through the lower dorsal nerves is the chief cause. In advanced cases the kidney is found to be structurally damaged even though urinary pathology is absent.

Low Blood Pressure

The term low blood pressure is commonly applied to both systolic and diastolic pressures below average normal. In many cases the low pressure has always been present, and it is highly probable that in those individuals the low blood pressure is a normal blood pressure. Most authorities agree that

systolic pressures as low as 90 in women and 100 in men are compatible with good health.

When blood pressure is reduced to a point below normal, it is due to a decrease in the resisting or in the propelling force or both. It may be due to a decrease in the amount of blood as would result from extensive hemorrhage. Profound anemia tends to produce fatty degeneration of the heart and blood vessels; consequently, it is a cause of low blood pressure. Low blood pressure is also found to be associated with dilatation of the heart and chronic myocarditis, a generic term which includes both inflammatory and degenerative processes of the myocardium. Aneurysm of the aorta tends to reduce greatly the diastolic pressure but may be associated with hypertrophy of the heart which raises the systolic pressure. Aneurysm of the arch of the aorta between the innominate and left subclavian arteries is a common cause for a wide variation in the blood pressure of the two brachial arteries. Hemorrhages, dysentery, and large effusions into the serous cavities lower the blood pressure by decreasing the amount of fluid in the circulation. Wasting diseases lower the blood pressure because of the weakening of the vital circulatory organs and the dehydration of the tissues.

Significance of Variations in Blood Pressure

An increase in the systolic pressure with the diastolic pressure remaining at the normal level denotes increased activity on the part of the heart. This increased activity may occur with or follow exercise, emotions, stimulants, hearty eating, or hypertrophy of the left ventricle. Increased activity of the heart muscle causes an increase in the volume of blood being propelled through the arterial system, but it does not increase the active resistance offered by the arteries; consequently, it will be seen that an increase in the systolic pressure alone is the result of physiological causes.

High Systolic and Low Diastolic Pressure

An increase in the systolic pressure with a decided decrease in the diastolic pressure indicates aortic regurgitation. Systolic pressure of 150 and diastolic pressure varying between zero and 50 are common in this condition. The increased systolic pressure results from the adaptive hypertrophy of the left ventricle. The decline in the diastolic pressure is due to the incompetent aortic valve permitting blood to regurgitate into the left ventricle, thus reducing the arterial pressure during the rest period of the ventricle.

High Systolic and High Diastolic Pressure

Any decided increase in the systolic pressure accompanied by an increase in the diastolic pressure is commonly encountered in those numerous cases so well known by the title "high blood pressure." Primarily these changes in the pressure are due to increased peripheral resistance from arteriosclerosis or hypertension of the arteries. To meet this increased arterial resistance the heart undergoes hypertrophy. As the peripheral resistance increases, the diastolic pressure rises; and in proportion as the heart undergoes hypertrophy, the systolic pressure increases. In arteriosclerosis the systolic pressure rarely exceeds 170. This is due to the fact that the process of hardening so well defined in the arteries is also occurring in the heart muscle. Degenerative changes of the heart muscle lessen the force of its action and, therefore, limits the height of the systolic blood pressure. In advanced cases of arteriosclerosis the systolic pressure recedes, making the pulse pressure very low. Low pulse pressure in arteriosclerosis indicates a failing heart and will be characterized by fatigue, breathlessness, and pain. In high blood pressure due to hypertension the systolic pressure may exceed 300 mm; however, other cases may have hemorrhage with systolic pressure of 200. The ability of the arteries to withstand exceedingly high pressure depends upon the quality of the artery wall.

Normal Systolic and High Diastolic Pressure

An increase in the diastolic pressure indicates arterial hypertension which would immediately call upon the heart for increased action. Increased action on the part of the heart would in turn raise the systolic pressure; consequently an increase in the diastolic pressure without a corresponding increase in the systolic pressure would indicate a failing heart muscle and is commonly encountered in advanced arteriosclerosis and myocarditis. In all such cases there has been a time when the systolic pressure was above normal. Failure of the heart from dilatation or degeneration would not necessarily reduce the arterial tension and, therefore, would not affect the diastolic pressure.

High Pulse Pressure

High pulse pressure denotes increased circulation. It may be due to an increase in the rate of the heart or to an increased volume of blood propelled during each systole by a hypertrophied ventricle. High pulse pressures are encountered in aortic regurgitation, aortic aneurysm, toxic goiter, toxemias, and hypertension. It is not uncommon to discover a high pulse pressure during the first examination of a patient who is nervous or emotional. At subsequent examinations when the patient becomes acquainted with his doctor and is free from emotional tension, the pressure recorded will be a better indication of the patient's average blood pressure.

Low Pulse Pressure

A low pulse pressure indicates a weak heart muscle and is encountered in cardiac dilatation, chronic myocarditis, and fatty degeneration of the heart. These cases have but little reserve strength. The heart and the body fatigues under slight exertion. It is generally accepted that pulse pressures below 34 or 35 are subnormal; yet a pulse pressure of 28 or

30 may not produce symptoms indicating a weak heart. An allowance should be made for slight variations below 35 and above 50 before the pulse pressure is considered as being of pathological significance. Systolic pressures below 100 in men and below 90 in women are considered abnormal, but a diastolic pressure correspondingly below normal may indicate nothing other than a very elastic artery wall.

Blood Pressure in Pregnancy

The determination of blood pressure in pregnancy is considered more important than the examination of the urine by many authorities. In cases of impending uremia the pressure will rise before albumin is found in the urine. Systematic observation of the blood pressure should be made once per month during the early part of pregnancy and every week or two during the last two months. Any increase in the pressure should suggest frequent examinations and care in the management of the case. Systolic pressure of 140 during pregnancy is an indication of approaching uremia, while systolic pressure of 150 is considered a danger signal.

Blood Pressure in Pneumonia

Consolidation of the lung tends to flatten the pulmonary capillaries, thereby offering resistance to the pulmonary circulation. Prolonged strain upon the wall of the right ventricle because of this resistance leads to its dilatation and at the same time weakens the wall of the left ventricle. During pneumonia the pulse rate is rapid; as the heart weakens the pulse rate is increased. It may be said that as long as the systolic pressure expressed in millimeters exceeds the pulse rate expressed in beats per minute there is no immediate danger of dilatation and consequent pulmonary edema; but when the systolic pressure falls below the pulse rate, the prognosis is not favorable. This indicates that the heart muscle is weakening under the heavy strain of pumping blood through the obstructed lung.

Extremely Low Pressures

The conditions giving the lowest readings are shock, collapse, internal hemorrhage, and toxic paralysis of the vasomotor center. This latter condition is very common in diphtheria. The lowest recorded reading of systolic pressure followed by recovery is 50 mm.

The Relation of Blood Pressure to Life Insurance

In practice the primary purpose of blood pressure tests is for the purpose of differential diagnosis; but to the physical director of an insurance company blood pressure, if persistently abnormal, is evidence of present or impending degeneration. The physical director is concerned with the problem of selecting the good risks and rejecting the poor ones. Much depends upon his judgment, not only to the company but to the applicant. The blood pressure of the applicant is just one of the measurements used in classifying the risk to be assumed by the company in accepting an applicant. In order that these measurements may be reliable, it is highly essential that the information acted upon be accurate. Therefore, great care should be observed in the technique of taking the blood pressure. The examiner has a great responsibility; he is one of many who are gathering data which cannot be obtained in any other way. The usefulness of the information the examiner furnishes is not only the basis for many decisions by the company, but to a large extent the standing of the company depends upon the accuracy of his findings. This thought should be an inspiration for the exercise of real diligence in making the examination and particularly in taking the blood pressure.

Technique of Measuring Blood Pressure

The two methods of taking blood pressure are known as the palpatory and auscultatory methods. The palpatory method is used when extreme accuracy is not essential; but inasmuch

as its chief value lies in obtaining the approximate systolic pressure, it is of little scientific value. The auscultatory method is the only means of determining diastolic pressure and is the method in general use today. This method involves the use of a sphygmomanometer and a stethoscope.

The two types of instruments for measuring blood pressure are known as the mercury type and the aneroid type. The author prefers the mercury type instrument and uses a Baumanometer. The mercury type instrument is scientifically correct if individually calibrated in millimeters. It should have a large legible scale which is easily read by the examiner.

The Bowles model stethoscope is most universally used because of its simplicity and flexibility in making examinations. In selecting a stethoscope the individual should test it for the transmission of sounds and fit it to his own head; the ear tips should be comfortable and should so fit that they exclude extraneous sounds, yet not so tight that its use would be unpleasant.

When to Take Blood Pressure

Inasmuch as exercise, eating, and excitement raise blood pressure, it is preferable to measure blood pressure midway between meals and after a short rest. The normal increase of blood pressure following meals and light exercise is from 5 to 15 millimeters. More strenuous exercise and emotional excitement increase the pressure still more. There is a tendency toward a slight and gradual rise of 10 to 15 millimeters during the day. These facts are worthy of note and account for some variations observed when the pressure is taken at different times of the day.

For convenience the left arm is used in measuring blood pressure. The patient should be seated facing the examiner; the left arm should be bared to the shoulder; and careful attention should be given to avoid the clothing being rolled tightly upon the upper arm. The arm should rest on a desk or table in a state of relaxation. The patient should not

stretch his arm, grip his fingers, nor sustain weight on the arm being examined.

Sitting in a comfortable position, the examiner should face the patient. This permits him to observe the effect of the examination on the patient or correct a faulty position of the patient. The mercury type instrument should be placed on a level surface facing the examiner to insure proper results.

Placing the Cuff

The cuff consists of a rubber bag with a cloth covering the arm band, which serves as a binding device. The center of the compression bag should be placed directly over the brachial artery on a level with the heart. In this position the sleeve band should be wrapped around the arm and the last two or three inches of the band tucked into the final fold of the wrapping. Care should be used to avoid wrapping so tightly that the tissue is compressed; likewise the band should not be wrapped so loosely that it will slip to the elbow.

The stethoscope should be placed over the bifurcation of the brachial artery at the crease of the elbow and below the cuff. Care should be exercised to avoid permitting the stethoscope to slip under the cuff, as this interferes with proper compression and gives rise to false readings. The rubber tubing of the stethoscope should not be permitted to move against clothing or the examiner's hand because the vibrations thus created interfere with the clearness of the arterial taps.

Determining Systolic Pressure

After the cuff has been placed as described with the needle valve of the compression pump closed, apply pressure by means of the pump and with the left hand palpate the pulse. Continue to increase the pressure until the pulse disappears. Do not apply pressure of 200 millimeters when 150 is sufficient to shut off the radial pulse.

Apply the stethoscope over the brachial artery and release the pressure slowly by means of the needle valve. Listen carefully for pulse sounds. The first sound is clear but not necessarily loud. It is easily distinguished, as the beats or taps following are rhythmic and regular. The level of the mercury in the calibrated tube at the time of the first tap followed by successive taps indicates the systolic pressure. An occasional tap not followed by successive regular taps should be desregarded.

Determining the Diastolic Pressure

After ascertaining the systolic pressure, continue to release the pressure by permitting air to escape slowly and gradually through the needle valve. As the mercury drops 10 to 20 millimeters, it will be noted that the tone and volume of the sounds change. The level of the mercury when the last well-defined tap occurs indicates the diastolic pressure.

Synopsis of Ausculatory Method

The cuff should be applied, preferably to the left arm, on a level with the heart, the subject sitting and the arm resting on a table or desk. Place the stethoscope over the brachial artery just below the cuff, avoiding undue pressure. Inflate the sphygmomanometer bag until the heart sounds disappear; slowly release the air until the sound reappears. The first sound followed by successive sounds is the level of the systolic pressure. It is the beginning of the first phase. Continue slowly to release the air through the needle valve; and it will be noted that after the mercury has descended 10 to 12 mm., the sounds become large and booming for a distance of 10 to 20 mm. This is termed the second phase but is not recorded in the reading. The second phase is followed by the third which begins at the point where the large booming sounds become sharp and less pronounced. This phase is also disregarded in the blood pressure rating. These sharp sounds or taps continue for a few millimeters and then become abruptly

muffled. The point of muffling is the level of the diastolic pressure and the beginning of the fourth phase. As air is continued to be released, the muffled sound disappears entirely constituting the fifth phase which is of no consequence in taking blood pressure.

The Effects of High Blood Pressure

Increased arterial tension throws added work upon the heart and results in its hypertrophy. The action of the hypertrophied left ventricle is the cause of increased systolic pressure. This in itself is not dangerous since the hypertrophy is adaptive to increased peripheral resistance. Conditions which increase the peripheral resistance diminish the elasticity of the artery wall and thus destroy its integrity. Some arteries are deranged more than others or one part of an artery may be impaired more than another part. In due time the weakened part yields and either stretches producing an aneurysm or ruptures permitting the escape of blood.

The chief effect of high blood pressure is hemorrhage. This commonly occurs into the cerebrum from a terminal branch of the middle cerebral artery. Hemorrhages into the ventricles of the brain or meninges may also be found. Intracranial hemorrhages may be small and localized or may be massive and diffuse. Intracranial hemorrhages may suddenly be fatal or cause a paralysis which corresponds to the portion of the brain damaged. Occasionally hemorrhages occur into the spinal cord; nosebleed is a very common occurrence. High blood pressure may be suddenly increased by exertion and emotions. It is not uncommon for a cerebral vessel to dilate under such circumstances. Dilatation of a cerebral artery may cause temporary symptoms similar to those of apoplexy; but when the blood pressure diminishes, the stretched artery wall may recede, and the pressure symptoms caused by it will promptly disappear.

Exceedingly high pressures are often designated as **malignant hypertension**; often they cause massive intracranial hem-

orrhage. A patient with ordinary high blood pressure may live comfortably many years. This is particularly true when the pressure increases slowly late in life. It has been said that pressures between 175 and 200 are well borne with years; pressure of 200 to 220 indicate a sword is suspended overhead; and pressures above 220 indicate that sword is hanging by a hair.

The Effects of Low Blood Pressure

The nutrition and strength of the body is dependent upon the oxidation of food in addition to trophic impulses. The presence of oxygen is essential in assimilation. In low blood pressure the velocity of the circulating blood is greatly reduced; consequently its oxygen carrying capacity is diminished. This results in suboxidation with ensuing asthenia. Low blood pressure produces fatigue and breathlessness, both of which are greatly increased upon exertion. There is often ischemia of the brain, particularly when in the erect posture; this predisposes to syncope.

Adjustments for High Blood Pressure

Most cases of hypertension and arteriosclerosis are the result of inadequate elimination. Metabolic waste is produced in all parts of the body and is disintegrated by the spleen or in the blood stream. The liver rearranges waste elements in preparation for elimination. The kidney acts as a filter removing water and prepared solids from the blood stream. These are secreted by the kidney as urine which is excreted from the bladder. Detoxification of the body is dependent upon chemical processes in the blood stream as well as the normal functioning of the spleen, liver, kidney, intestines, and bladder. Dysfunction of any of these organs may lead to a state of autointoxication. Retained poisons irritate vasomotor nerves or sensory nerves which induce motor reflexes. Vasoconstriction is a natural response to toxic irritation, and vasoconstriction is a cause of hypertension. Upper cervical nerves influ-

ence the vasomotor center in the brain; hence upper cervical adjustments are often of value in reducing blood pressure. Spinal nerve irritation throughout the dorsal and lumbar area may influence the action of vasomotor cells in the lateral horn of the cord and become a cause of hypertension; therefore, dorsal and lumbar subluxations should be corrected wherever they are found. The liver, spleen, and stomach are supplied by the greater splanchnic nerves from the fifth to ninth dorsal vertebræ; and the kidneys are supplied by the lesser and least splanchnics from the tenth to twelfth dorsal vertebræ. It is not uncommon that a ninth or tenth dorsal subluxation may affect the liver and spleen or liver and kidney. Interference with the flow of vasodilator impulses from the lower thoracics causes constriction of the renal arteries—a change which occurs early in hypertension. Lower dorsal adjustments are of utmost importance in all cases of hypertension. Most cases of nervousness hypertension which are found in young people having no discoverable physical cause for the high pressure are usually corrected by upper cervical adjustments. Rest and freedom from excitement and mental strain are of particular value in the management of nervous hypertension.

Adjustments for Low Blood Pressure

In cases of low blood pressure the essential adjustment varies according to its cause. When due to weakness of the heart, upper dorsal adjustments are most valuable. When due to atony of the splanchnic vessels, dorsal adjustments are indicated. When the blood pressure has been lowered because of anemia, polyuria, or dysentery; adjustments must be directed toward the cause of the primary condition.

CHAPTER XII

DISEASES OF THE CIRCULATORY SYSTEM

Pericarditis

The pericardium is a large seromembranous sac surrounding the heart and the trunks of the large blood vessels. It has two layers, the visceral and parietal, the visceral layer being the one reflected upon the myocardium.

Pericarditis is an inflammation of the pericardium and is frequently associated with diseases of the lung and pleura. The proximity of the pericardium to these structures, its movement influencing them and vice versa, and the nearly identical nerve supply explains why a morbid process in any of the three may implicate the others. Pericarditis is similar to pleurisy and inflammations of other serous membranes in that it also goes through three stages: fibrinous, serofibrinous, and purulent. These are not specific diseases but merely stages in the same process.

Acute Fibrinous Pericarditis

Definition.—Acute fibrinous pericarditis is an inflammation of the pericardium associated with the formation of fibrinous exudate. It has a tendency to develop adhesions.

Adjustments Pericarditis is frequently secondary, and the adjustment should be directed toward its primary cause. In all cases adjustments should include upper, middle, and lower dorsal areas.

Pathology.—There is hyperemia of the pericardium giving it a deep dark red color and a swollen appearance. A layer of fibrin forms upon the inflamed surface. The fibrin may be absorbed or an effusion of serous fluid may be added to it. The condition then becomes pericarditis with effusion or serofibrinous pericarditis.

Symptoms.—Pericarditis may be preceded by acute or chronic diseases such as rheumatic fever, pneumonia, influenza, pleurisy, or tuberculosis. Prodromal symptoms of these conditions may precede those caused by the pericarditis.

The onset of pericarditis is marked by chilliness or a chill with rigors. The temperature is above normal and may follow a remittent or intermittent course. There is a sense of constriction in the chest. Pain may be mild or severe and may radiate to the neck through the phrenic nerve. Often there are palpitation and irregular and rapid pulse. The respirations are hurried and shallow, resembling those of pleurisy.

Upon palpation friction fremitus may be detected. Auscultation divulges friction sound. Extensive adhesions may impair action of the heart. When the pericardium is adherent, there may be visible retraction of the eleventh intercostal muscle during each ventricular systole; this is known as Broadbent's sign.

Many cases of fibrinous pericarditis are chronic from the onset. They usually are painless. Adhesions may form to the lung or diaphragm. A frictional or pericardial murmur may be detected. This murmur is located at or near the apex; it is systolic in time and is not transmitted. It may be heard in but one position, disappearing with a change in position. Broadbent's sign is present should the pericardium become adherent.

Serofibrinous Pericarditis

Definition.—Serofibrinous pericarditis is an inflammation of the pericardium in which the exudate of fibrin is followed by an effusion of serum.

Adjustment.—See fibrinous pericarditis.

Pathology.—In the acute stage the layers of the pericardium are engorged and covered with fibrin. At this period pain is common. In a few days there is an effusion of clear or cloudy serous fluid. The quantity of fluid may vary from four ounces

to four pints. The number and character of the cells vary with the cause. Lymphocytes are abundant in tuberculosis inflammations, while neutrophils are abundant in more acute infections.

Symptoms.—The sharp stitch pains which exist in the fibrinous stage promptly subside when the effusion occurs. There is, however, a marked thoracic discomfort consisting of a sense of thoracic constriction and breathlessness. The facial expression is anxious. Respiration and heart action are accelerated. Cyanosis and orthopnea are usually present. The patient is restless, may be delirious during the night, and frequently is a victim of fainting.

The intercostal spaces to the left of the sternum may project forward due to pressure by the effusion in the pericardial sac. The apex beat may be rendered invisible and impalpable. Percussion reveals an increased area of tranverse dullness above the diaphragm. Auscultation reveals a friction rub in the early stages; with the presence of fluid this murmur disappears. Radiographic examination reveals the extent of the effusion and confirms the diagnosis.

Purulent Pericarditis

Definition.—Purulent pericarditis is an infectious inflammation of the pericardium in which there are the formation and accumulation of pus. It is also known as **empyema of the pericardium.**

Adjustment.—Adjustments should include upper, middle, and lower dorsal.

Pathology.—Acute fibrinous and serofibrinous stages may precede empyema of the pericardium. The blood vessels of the pericardium are congested; there are an exudation of fibrin from its surface and a serous effusion into the pericardial sac. The pyogenic organisms which are most commonly present are pneumococci, streptococci, or staphylococci. Adhesions sometimes occur.

Symptoms.—At the onset there is pain which is synchronous with the action of the heart. It is usually severe and associated with a sense of constriction in the chest. The facial expression may be anxious. When the effusion occurs, the pain subsides. The anxious facial expression persists, and there are usually dyspnea and cyanosis. Most patients are compelled to assume the erect position. Pulse and respiration are increased, and there is usually fever. When the effusion is purulent, there are chills, fever, and sweats. There is an increase in the white blood count. Symptoms of shock may appear, and the termination is often fatal. The physical signs are those of pleurisy with effusion.

DISEASES OF THE HEART

Acute Endocarditis

Definition.—Acute endocarditis is an inflammation of the tissue lining the heart and covering the surface of its valves.

Adjustment.—Causative subluxations will be found in the upper dorsal region. Middle and lower dorsal adjustments which will improve elimination in toxic or infectious cases are indicated.

Pathology.—For convenience endocarditis is classified as being simple, rheumatic, or bacterial.

In simple endocarditis there is edema of the endocardium, the consequence of congestion. This may cause the valve segment to undergo a change in shape which prevents it from properly fitting the orifice it guards. Wart-like vegetations form upon the surface of the endocardium, and part of the lining may be invaded by an erosion or become involved in the development of scar tissue. Scar tissue upon contracting warps and deforms the valve segments. The erosions leave the surface or edge of the valve segment rough and uneven. When infection exists in the body, these vegetations may become infected; or the condition may follow a nonbacterial course, leading to chronic endocarditis.

Rheumatic endocarditis is usually acute. It is characterized by the appearance of Aschoff bodies which are found both in the endocardium and myocardium. Noninfectious erosions may develop. The valve segments become greatly thickened and distorted, and the heart muscle undergoes hypertrophy to compensate for the resultant valvular defect.

In **bacterial endocarditis** there are vegetations from one to twelve millimeters in diameter. They are of gray color after clotted blood has been removed. They are composed of fibrin and bacteria, being very friable or easily crushed. The bacteria most commonly present are the streptococci, staphylococci, or pneumococci. In this form of endocarditis petechiæ are often found in remote parts of the body. Embolism is common; and since the emboli are infectious in character, infectious processes may develop in organs where the emboli lodge.

Symptoms.—In mild cases the symptoms may be very moderate consisting of precordial pain, slight fever, dyspnea, irregularity in the pulse, and a low-pitched murmur in the area of the affected valve. In more severe cases the disease is initiated by a chill followed by a rapid rise in the temperature and severe precordial or abdominal pain. The fever may be intermittent or remittent with delirium, stupor, or coma. In the course of a week or two the acute symptoms subside, and the affection follows a subacute course.

In rheumatic cases there are always fever and cardiac disturbances from the onset. It is usual that the patient is convalescing from a recent attack of rheumatic fever; however, in other cases the heart complication develops during rheumatic fever. The pulse rate is rapid with attacks of palpitation. The heart may dilate abruptly, producing cardiac edema. Murmurs are audible chiefly on the left side of the heart. There may be a moderate leukocytosis. The damage to the heart valves may be small or great and is not in proportion to the evidences indicating rheumatic fever. In some instances no joint swelling or redness has ever existed, but the patient

has complained of pains in the legs usually during nighttime. The sudden development of cardiac symptoms with valvular murmur when there is a history a recent rheumatic fever is the chief basis for a diagnosis of rheumatic heart disease.

In acute bacterial endocarditis usually the fever is high and of the remittent type. The leukocyte count is two or three times normal. Valvular murmurs are audible early. Petechiæ appear in the skin. Osler's nodes develop near the finger tips: these nodes are purplish in color and tender. General septicemia develops; and the brain, meninges, or other organs may become the site of acute infection. The course is four to eight weeks. The prognosis for recovery is unfavorable.

Subacute bacterial endocarditis is more common than acute bacterial endocarditis. The bacterium most commonly present is the streptococcus. Generally the infection attacks the valve which has been injured by a previous disease. Organic heart murmurs develop early in the disease and prevail throughout it. In addition to alteration in the heart valves, there are minute hemorrhages throughout the body; these affect skin, surface of the kidney, brain, and heart muscle. Fever is an early symptom in subacute bacterial endocarditis; it follows a remittent course and attains a height of 102 degrees. At first it may be thought that the fever is related to a nose or throat inflammation which often precedes the endocarditis. The patient loses weight and strength rapidly. His skin assumes an ashen-gray color. The red cells are reduced by one-fourth the normal number of cells. There is moderate leukocytosis. Blood and albumin may appear in the urine. The fingers often become clubbed. In the late stages there are abnormal distention, marked exhaustion, and mild delirium. Most cases terminate unfavorably.

Chronic Endocarditis

Definition.—The term chronic endocarditis is applied to chronic defects of the heart valves which ordinarily do not

result from acute or subacute endocarditis. Chronic valvular defects may be congenital, rheumatic, syphilitic, sclerotic, or inflammatory.

Adjustment.—Causative subluxations will be found in the upper dorsal area of the spine.

Chronic valvular diseases of the heart are the result of deformity caused by a chronic disease process. The deformity may be considered as the scar which results from a previous damage. Chiropractic adjustments do not remove this scar nor correct the distortion of the warped valve. When the myocardium is fully compensating for the valvular defect, adjustments are not of immediate importance. It is evident that compensation will be maintained for a long period of time if normal nerve energy and normal nerve force reach the heart and are expressed in its muscle. Therefore, adjustments given during the period of compensation are for the purpose of prolonging that compensation. When the heart muscle begins to weaken and cause subjective symptoms, that patient seeks relief from these symptoms. At that time the purpose of the adjustment is to restore normal nerve transmission to the heart which will enable the heart muscles to maintain compensatory hypertrophy. The activating nerves that supply the heart and control its metabolic processes are the upper thoracic sympathetic fibers. Upper dorsal adjustments are, therefore, indicated in chronic endocarditis. Rest, proper diet, and advice relating to physical activity are highly important in the management of these cases.

Pathology.—Congenital valvular disease is a developmental defect most commonly found in the pulmonary orifice; but occasionally it involves the mitral, aortic, and tricuspid valves in the order named.

Chronic valvular defects which are rheumatic in nature occur in individuals who have a history of rheumatism. The cusps are scarred, thickened, and warped. Chrodæ tendineæ may be shortened, and there may be adhesions between the

cusps. The cusps may fit imperfectly and permit regurgitation, or the orifice may be partially obstructed by the thickening of tissue.

Syphilitic endorcarditis most often occurs fifteen to twenty years after the onset of syphilis. The aortic valve is damaged by fibroid changes which begin in the aorta and extend to the aortic orifice. The valve segments are thickened, stiffened, and often retracted. The aortic ring may be diminished or dilated, thus causing either atenosis or regurgitation.

When chronic valvular disease develops during or after middle life in those patients who have arteriosclerosis, the condition is said to be sclerotic in nature. The valves on the left side of the heart are most commonly involved by thickening, warping, and calcification.

Numerous acute febrile diseases have an injurious effect upon the endocardium that is not evident at the time the disease is active. After recovery indications of valvular defect are detected. The endocardium becomes congested and edematous; later it is thickened by the development of fibrous tissue. Contraction of the newly formed fibrous tissue warps or distorts the segments so that they fit imperfectly.

Symptoms.—When a valvular defect impedes the circulation, the heart muscle if undamaged becomes hypertrophied in its endeavor to meet the requirements of the body for food and oxygen. This enlargement of the heart produces physical signs, but there are no subjective symptoms. All subjective symptoms arising in chronic valvular disease of the heart are the result of a weakening of the heart muscle: this may be termed myocardial failure, myocardial insufficiency, decompensation, broken compensation, or ruptured compensation. When the action of the heart is impaired by myocardial failure; the three chief subjective symptoms are fatigue, breathlessness, and pain. The fatigue does not yield to rest and becomes extreme upon exertion. Breathlessness does not only occur upon exertion but is continuous and accentuated upon

every effort. In connection with this breathlessness, there is a tendency toward sighing, which is involuntary. Pain may be mild or severe and includes any uncomfortable sensation. In some cases it consists of a sensation of choking or globus hystericus; in other cases it may be a sensation of thoracic constriction; while in still other cases the pain may be mild or most intense: when intense it is commonly called angina pectoris.

Upon examination inspection may reveal an increase in the area of visible cardiac pulsation which is displaced downward and to the left. Palpation may reveal displacement of the palpable apex beat downward and to the left. The pulse as detected by palpation may be small and rapid when the heart muscle is failing or large and of good tension when a state of compensation exists. Percussion may reveal an increase in the area of cardiac dullness vertically and to the left. Auscultation may reveal murmurs, the location of maximum intensity being in the area of the valve involved.

Valvular deformities produced by chronic endocarditis may render a valve incompetent to perform its normal function, or the orifice guarded by a valve may become constricted by a thickening of the surrounding tissue. When the valvular deformity produced by chronic endocarditis renders the valve incapable of guarding its orifice, the condition is known as incompetency; an incompetent valve permits regurgitation. Regurgitation disturbs the function and causes vibrations to arise; these abnormal vibrations are termed murmurs. When a valvular orifice becomes enlarged because of a stretching of tissue, and the valvular segments are no longer of sufficient size to guard the enlarged orifice; the condition is known as insufficiency. Whether a valve is insufficient or incompetent, regurgitation is permitted. In diagnosis the murmur specifically indicates regurgitation, and it is judged that the valve is incompetent or insufficient.

When chronic endocarditis causes an orifice of the heart to become narrowed, it is known as stenosis or obstruction. Hence

the term mitral stenosis and mitral obstruction are regarded as synonymous.

Aortic Incompetency

Definition.—Aortic incompetency is a result of chronic endocarditis in which deformity of the left semilunar valve prevents it from properly guarding the aortic orifice during the diastole of the heart.

Symptoms.—As long as hypertrophy compensates for the regurgitation, there are no important symptoms. The patient may feel strong and be active. His circulation is accelerated, and he may require less sleep than usual. His pulse is large and near normal in rate but falls abruptly; it is known as Corrigan's pulse, the water-hammer pulse, and the shot pulse. There may be capillary pulsation, which may be observed by rendering the tip of the fingernail anemic. Occasionally patients will complain of vertigo, syncope, insomnia, and headache.

When compensation weakens, there are fatigue, breathlessness, pain, palpitation, and dyspnea. As venous stasis develops, there will be cough and expectoration. Cyanosis may become apparent. Edema develops in the lower extremities. The liver becomes enlarged and freely palpable. Passive congestion of the kidney may cause a decrease in the flow of urine, and the urine may contain albumin.

These physical signs of aortic incompetency are evident during compensation: inspection may reveal precordial bulging and an increase in the area of visible cardiac pulsation. Upon palpation the apical impulse may be felt downward and to the left in the sixth or seventh intercostal space. Percussion may reveal the area of cardiac dullness increased vertically and to the left. Upon auscultation a diastolic murmur is heard over the aortic area at the second right intercostal space. This murmur may be transmitted by the wall of the left ventricle to its apex. The second aortic sound may be imperceptible having been displaced by the diastolic murmur. A murmur

usually remains loud as long as the heart muscle is reasonably strong. It diminishes in intensity as the left ventricle dilates. The X-ray shadow shows the heart greatly enlarged and the apical shadow rounded. Cor bovinum is a term applied to extreme enlargement of the heart. It is seldom that the heart enlarges more than in aortic regurgitation.

Aortic Stenosis

Definition.—Aortic stenosis is a narrowing of the aortic orifice which offers resistance to the outward flow of blood from the left ventricle.

Symptoms.—As in all valvular defects, subjective symptoms are absent during the period of compensation. When mycardial failure develops, the symptoms of lost compensation appear.

Aortic stenosis is frequently associated with aortitis. It commonly develops in middle life or late in life and is associated with arteriosclerosis. Since the lumen of the aortic orifice is diminished, resistance is offered to the outward flow of blood from the left ventricle. This raises the endoventricular pressure and leads to eccentric hypertrophy. The cardiac cycle may be rearranged, the systole being prolonged and the diastole shortened. The pulse is characteristically small and known as pulse parvus.

The apex beat is displaced downward and to the left. A systolic thrill is usually palpable at the second right intercostal space. Cardiac dullness is increased vertically and to the left. The murmur is systolic in time and is transmitted into the neck by the carotid arteries.

A murmur may arise at the aortic orifice without stenosis providing there is a roughness of the aortic segments or adjacent aorta. If no obstruction is offered, there is no reason for hypertrophy developing; hence, a systolic murmur in the aortic area are without evidence of cardiac enlargement is by no means a pathognomonic sign of aortic stenosis.

Should dilatation of the left ventricle occur, there may be a stretching of the left auriculoventricular septum with enlargement of the mitral orifice and a consequent relative mitral insufficiency. The pulse then may become rapid and small with evidences of venous stasis. Cheyne-Stokes respiration, considered a grave symptom, often develops.

Mitral Incompetency

Definition.—Mitral incompetency is a defect of the mitral valve which prevents it from closing the left auriculoventricular orifice during the systole of the heart.

Symptoms.—This is the most common valvular defect of the heart. While hypertrophy is adequate to compensate for the valvular defect, symptoms are absent. There are signs of cardiac hypertrophy and the systolic murmur in the mitral area. This murmur is transmitted to the axillary line or the back and may be diffuse. When diffuse it may be audible in every part of the chest wall. The maximum intensity of the murmur is always at or near the apex beat. At the apex beat there is also a palpable systolic thrill usually localized in a relatively small area.

When compensation is lost, there are fatigue, dyspnea, cyanosis, palpitation, and often orthopnea. A distressing cough which results from passive pulmonary congestion develops; it is usually productive, and the sputum may be blood tinged. The cheeks are usually flushed with a cyanotic tint. Cyanosis is also evident in the lips and nails. The pulse is always rapid, small, and of low tension in mitral disease; and when myocardial failure develops, it may become arrhythmic. There are often premature systoles, which cause the pulse to be intermittent. Venous stasis, as in other valvular defects, produces cardiac edema which first shows in the lower extremities. The edema progressively increases and may be associated with ascites.

The physical signs are present during the stage of compensation and during the period of myocardial failure. If the

valvular disease developed early in life, there will be precordial bulging. The apex beat is displaced downward and to the left; dullness on percussion is increased vertically and to the left; and the murmur is systolic in time, having its maximum intensity at the apex beat.

Mitral regurgitation may be associated with mitral stenosis. This is inclined to develop in the so-called buttonhole mitral valve wherein adhesions occur between the segments. The murmur of mitral stenosis will be presystolic in time; but during the late stage of myocardial failure it may become diastolic because of the development of auricular fibrillation.

Mitral Stenosis

Definition.—Mitral stenosis is a narrowing of the mitral orifice which offers resistance to the passage of blood from the left auricle.

Symptoms.—Mitral stenosis may be associated with mitral incompetency. Often it may not be discovered because the murmur of mitral regurgitation is more readily detected. Mitral stenosis may exist without symptoms during the period of compensation. There are two evidences of which the patient may be cognizant; namely, slight cough and an accelerated pulse rate. These symptoms, however, are by no means conclusive evidence of heart disease. The cough is a result of passive pulmonary congestion which is slight during the period of compensation but very pronounced when compensation is lost.

The physical signs of passive pulmonary congestion are confined chiefly to the base of the lung. Vocal fremitus is increased. Percussion may reveal impaired pulmonary resonance. On auscultation it will be noted that the breath sounds are coarse and prolonged with crepitant rales when there is fluid in the alveoli of the lung; subscrepitant rales are heard when there is fluid in the terminal bronchioles. With loss of

compensation all subjective symptoms of the failing heart develop. The physical signs of mitral stenosis are displacement of the apex beat downward and to the left, increased cardiac dullness transversely and vertically, a presystolic murmur at the apex beat, and a presystolic thrill palpable at or near the apex beat. Should auricular fibrillation develop, the duration of the presystolic murmur will be prolonged, and it may be audible throughout the long pause of the heart. It is then spoken of as a diastolic murmur.

Tricuspid Incompetency

Definition.—Tricuspid incompetency is a defect of the tricuspid valve wherein it is unable to guard properly the right auriculoventricular opening. In incompetency the valvular segments are deformed. In tricuspid insufficiency the orifice is enlarged as a result of cardiac dilatation, and the murmur is often said to be functional.

Symptoms.—Tricuspid incompetency as a result of endocarditis is relatively rare. When it occurs, the pressure within the right auricle is increased, thus offering resistance to drainage through the venæ cavæ. Pulsation of the jugular veins may be observed, and palpation may reveal venous pulsation of the liver. The liver becomes congested and palpably enlarged. Edema develops in both upper and lower extremities. The prominence of the above evidences of tricuspid incompetency varies during the period of compensation. When compensation is ruptured, the symptoms of congestive heart failure appear as they do in other chronic valvular diseases.

The physical signs prevail during the periods of compensation and decompensation. There is increased cardiac dullness discoverable upon percussion. The murmur is systolic in time and is best heard below the fourth rib; it may be audible on both sides of the sternum. Venous pulse with both pulsation and enlargement of the liver are strongly suggestive of tricuspid incompetency.

Tricuspid Stenosis

Definition.—Tricuspid stenosis is a constriction or narrowing of the right auriculoventricular orifice. It is a rare development in endocarditis and may be associated with tricuspid regurgitation.

Symptoms.—When the heart muscle has adaptively hypertrophied, subjective symptoms are entirely absent. With myocardial failure subjective symptoms arise; these consist of exhaustion, attacks of palpitation, dyspnea, and cyanosis. The cardiac edema develops at first in the lower extremities. The nails show cyanosis, and the skin is cold and clammy.

During the compensatory period the presence of the stenosis is indicated by enlargement of the heart and presystolic murmur having its maximum intensity in the tricuspid area. When auricular fibrillation develops, this murmur may become diastolic in time. Often some other valvular defects coexist.

Pulmonary Incompetency

Definition.—Pulmonary incompetency results from a deformity of the pulmonary valve which prevents it from guarding the pulmonary orifice during the diastole of the ventricles.

Symptoms.—This is a relatively rare valvular defect. When the condition does develop during the course of endocarditis, it is associated with defects of the other valves. As pulmonary regurgitation develops, hypertrophy of the right ventricle follows to compensate for this valvular defect. During the period of compensation subjective symptoms are in abeyance.

The physical signs discovered by inspection, palpation, and percussion indicate enlargement of the heart. In hypertrophy of the right ventricle the apex beat is displaced to the left but not downward, and the transverse cardiac dullness is decidedly increased. The murmur of pulmonary incompetency is diastolic in time, and its maximum intensity is in the second left

intercostal space. The murmur may be transmitted by the wall of the right ventricle to the tricuspid area and toward the apex beat. When compensation fails, the symptoms and signs are those of a failing heart.

Pulmonary Stenosis

Definition.—Pulmonary stenosis is a narrowing of the pulmonary orifice which offers resistance to the flow of blood from the right ventricle into the pulmonary artery.

Symptoms.—Pulmonary stenosis is the most common congenial defect of the heart. It may be the only defect, or it may be associated with patent foramen ovale or patent ductus arteriosus. Other septal defects may coexist, such as a cleft of the ventricular septum which permits the mixing of arterial and venous blood. The earliest evidence of pulmonary stenosis is cyanosis. In the infant cyanosis may be the sole sign that can be observed. Formerly the cyanosis was thought to be due to the mixing of venous with arterial blood permitted by the patent foramen ovale; it is now believed that the cyanosis is almost always due to the pulmonary stenosis which interferes with pulmonary circulation. Later in life there is clubbing of the fingers providing circulation is greatly impaired. In cases which are not cyanosed, this symptom does not arise.

Auscultation reveals a systolic murmur in the pulmonary area or along the entire left border of the sternum. This murmur is not transmitted into the neck. There may be a systolic thrill palpable at the second left intercostal space. Many of the more severe cases die early in infancy, while many of the less severe cases attain old age and appear to be but little handicapped by the congenital valvular defect.

Hypertrophy of the Heart

The heart is an adaptive organ which under normal circumstances is capable of meeting the requirements of the body. During pronounced body activity much energy is expended,

and the heart participates by increased rate and force. When valvular defects develop, they offer resistance to the circulation of blood just as great as that offered by hypertension of the peripheral arteries. The added work thrown on the heart in overcoming this resistance causes its enlargement or hypertrophy.

Hypertrophy is said to be **simple** when the heart wall has increased in thickness without any alteration in the capacity of its cavities. Hypertrophy is said to be **eccentric** when there is an increase in the thickness of the heart muscle and an increase in the capacity of the cavities of the heart. This is the usual type of hypertrophy which develops in valvular disease of the heart and hypertension of the arteries. **Concentric** hypertrophy is an increase in the thickness of the walls of the heart and a decrease in the capacity of its cavities. It is believed that this is solely a post mortem finding. Hypertrophy may affect the one side of the heart; or it may affect the entire heart.

The left ventricle is more frequently hypertrophied than other portions of the organ. Left ventricular hypertrophy is adaptive to mitral and aortic diseases which are much more common than pulmonary and tricuspid diseases. It is true that the two ventricles contract simultaneously, but the endocardial pressure is greater in the left ventricle than in the right in mitral and aortic disease. In all cases of hypertrophy there is an increase in the amount of muscular tissue; it is of firm consistency and somewhat darker in color. The shape of the heart may be considerably altered by hypertrophy of the wall or any one or all cavities. Left ventricular hypertrophy is adaptive to mitral incompetency, aortic stenosis and incompetency, aneurysm of the aorta, arteriosclerosis, and hypertension. Right ventricular hypertrophy is more frequently encountered in pulmonary stenosis and incompetency but sooner or later develops in defects of the mitral valve. Hypertrophy of the left auricle is in the main adaptive to mitral defects,

while hypertrophy of the left auricle is chiefly secondary to tricuspid defects.

A patient having hypertrophy of the heart will state he is in excellent health. He may brag of his endurance and the fact that he requires but little sleep. Oxidation and body repair occur at a rapid rate. The patient's blood pressure is within normal range or slightly above. The pulse is large in size, slow in rate, regular in rhythm, and of good tension. The complexion is ruddy, and capillary pulsation may be observed in the fingernails and in a mucous membrane when it has been rendered anemic by pressure.

Dilatation of the Heart

The heart is said to be dilated when the muscular tissue has stretched and the size of the cavities increased out of proportion to the thickness of their walls. Dilatation may develop suddenly or gradually. When it develops suddenly, there may be symptoms of shock. The facial expression is anxious; there is air hunger; the skin is moist; the temperature is subnormal; and the pulse is small, thready, and easily compressible. Heart sounds are but vaguely audible. Cyanosis may be evident.

More often dilatation of the heart occurs gradually. The condition may be called **broken compensation, ruptured compensation,** or **decompensation;** or it is frequently termed **myocardial insufficiency** and **myocardial failure.** It is always attended by subjective symptoms which result from anoxemia. Its earliest symptoms are fatigue, breathlessness, and thoracic discomfort. These increase in intensity until the fatigue is not relieved by rest, and breathlessness occurs without physical effort of any kind. There is repeated sighing. The amount and distribution of pain varies greatly. In many instances it is not pronounced. Edema develops first in dependent parts of the body, and later there are effusions into the cavities. Effusions into the abdomen are known as ascites or hydroperitoneum; effusions into the thorax are called hydrothorax; and effusions

into the scrotum are termed hydrocele. There are always digestive disturbances. The digestive organs are as inefficient from the lack of oxygen as the the voluntary muscles; hence, digestive secretions and motility become subnormal. It is common for a patient with a failing heart to attribute its disability to the digestive disturbances, while the opposite is true. The heart action is rapid and irregular. The pulse is small, arrhythmic, and of low tension. Passive pulmonary congestion develops in the majority of cases. This may be discovered by the examination of the thorax. The congestion is near the base of the lungs when the patient is ambulatory, but when bedfast it involves that part of the lung which is lowest. In some cases the face has an ashen-gray appearance, while in others the cheeks become flushed and later cyanosed.

In chronic valvular diseases hypertrophy precedes dilatation. The stretching of the hypertrophied muscle is a result of prolonged overwork on the part of that muscle. A restoration of that hypertrophy is desirable; therefore, rest, careful regulated diet, and regular spinal adjustments are essential. Man's illness and disability is the sum total of all nerve interferences that exist in his body; therefore, the correction of all nerve interference is of value in cardiac failure. The removal of upper dorsal interference is of prime importance because activating impulses which control tonus and metabolism of the heart are supplied through the upper dorsal sympathetics.

Acute Myocarditis

Definition.—Acute myocarditis is also known as carditis. It is an inflammation of the muscular tissue of the heart.

Adjustment.—Acute myocarditis is usually secondary; therefore, adjustments must be made to correct the primary disease process. Adjustments should always include the upper thoracic vertebræ which are found to be subluxated.

Pathology.—Acute myocarditis is secondary to numerous infectious and toxic diseases; therefore, variation in structural

changes may be expected in the heart muscle. Among the more commonly associated conditions are rheumatic fever, typhoid, septicemia, pyemia, influenza, and the toxic thyroid. There is congestion of the myocardial vessels with cloudy swelling and granular changes in the muscle cells. The interstitial tissues may be infiltrated with lymphocytes, leukocytes, and a fibrinous-like exudate. During the later stages there may be albuminous, hyaline, or fatty degeneration. The destroyed muscular tissue is gradually absorbed and replaced by fibrous scar tissue. The pathologic changes may be limited to the wall of one ventricle, or the condition may be diffuse. In rheumatic cases Aschoff's nodules may be found in the myocardium; they develop near blood vessels, particularly those directly under the endocardium. Endocarditis is invariably associated with myocarditis, and it is difficult to discern how endocarditis can exist without some damage to the myocardium. Likewise, when the myocardium is seriously damaged, both the endocardium and epicardium may show structural alteration.

Symptoms.—Acute myocarditis may develop during the course of an acute infectious disease. The symptoms of the infection may obscure those of the myocarditis. Usually there is thoracic discomfort or pain. Associated with this is an anxious facial expression. The pulse is rapid, small, and often irregular. The blood pressure is lowered. Murmurs may be audible at any valvular area due to damage of the endocardium or dilatation: dilatation of the heart is to be expected because of the acute structural damage to its musculature. With dilatation the symptoms are those of congestive heart failure; namely, extreme exhaustion, breathlessness, dyspnea, pain, cyanosis, edema, oliguria, ascites, and the evidence of passive pulmonary congestion.

Acute mycarditis may be due to the lodgment of septic emboli in pyemia. Such cases are rarely diagnosed as myocarditis since the symptoms are overshadowed by those of the pyemia.

Chronic Myocarditis

Definition.—Chronic myocarditis is a chronic inflammatory process of the heart muscle. The term, however, includes all degenerative changes as well as inflammatory changes.

Adjustment—Chronic inflammatory and degenerative change in an organ may be related to disease of other organs. Spinal adjustments should, therefore, include those areas of the spine which innervate those organs which are the site of the primary condition. When myocarditis is primary, the cause is most apt to be found in the upper dorsal area of the spine; while the lower dorsal region should be included in the adjustment of all secondary causes.

Pathology.—In chronic myocarditis the heart is invariably enlarged. The enlargement may be due to either hypertrophy or dilatation. The blood vessels of the myocardium may be sclerosed. The interstitial fibrous tissue undergoes proliferation, causing marked fibrosis throughout the muscular tissue of the heart. Both hyaline and fatty degeneration may develop, particularly in toxic cases. Fatty infiltration, if present, is usually a part of general obesity and not a condition arising from heart disease. The excessive fat accumulation both in the heart and in the body cause enlargement of the heart and may restrict its action; also the added circulatory load may become unbearable.

Symptoms.—Chronic myocarditis possesses no subjective symptoms so long as the hypertrophy of the cardiac muscle compensates for the muscle tissue damaged. The symptoms which then arise are those of a failing heart. Failure of the heart may be congestive or anginal in type. The earliest symptoms of congestive heart failure are fatigue, breathlessness, and pain. These are later followed by dyspnea, cyanosis, edema, ascites, cough, palpitation, and other irregularities in the circulation. The pulse may be rapid and irregular, or there may be bradycardia. When the pulse rate is less than forty,

heart block may be suspected. When the pulse is periodically rapid, it may be due to paroxysms of tachycardia, auricular flutter, or auricular fibrillation. A rapid pulse is usually small in size, easily compressible, and arrhythmic with intermissions. The intermissions are due to premature systoles which are ineffectual.

Pain may be the only symptom of cardiac failure of the anginal type. It may be mild or severe and usually develops in response to effort or strong emotion. The pain is believed to result from ischemia of the heart muscle due to partial occlusion of the coronary system. This occlusion may be due to sclerotic changes in the vessel wall or to the fibrotic changes in the myocardium around the vessel walls. The pain may be located in the precordium, sternal area, and rarely the right side of the chest; moreover, it may radiate into the neck or left arm. When the pain is severe, it is termed angina pectoris. It should be remembered, however, that angina pectoris as a cardiac neurosis may exist without myocarditis or coronary occlusion. Usually, however, some of the congestive symptoms develop, particularly irregularities in the pulse, fatigue, and breathlessness. Coronary occlusion is a common complication.

Murmurs are not a result of myocardial damage in itself. If present, they suggest that the pathologic process of the myocardium has extended to and involved the endocardium. Should the heart dilate, valvular insufficiency may occur at one or more of the valvular orifices and will cause a regurgitant murmur.

Palpitation

Definition.—Palpitation is a rapid, forceful, and irregular action of the heart of which the patient is uncomfortably conscious. Palpitation may be looked upon as a symptom of organic heart disease, or it may occur as a motor neurosis due to imbalance between the heart's vagal and sympathetic innervation.

Adjustment.—Upper cervical or upper dorsal adjustments are indicated in cases of palpitation.

Symptoms.—Palpitation occurs in periodic attacks. It may be initiated by excitement or exercise, or it may occur suddenly without apparent cause. The forceful and rapid action of the heart may cause a visible impulse at the apex beat over a very large area. The patient is conscious of the forceful action and may mention the pounding within his chest. Often there are vertigo and flashes of light before the eyes. The patient is highly uncomfortable, has a fear of danger, and may be unable to stand but is more comfortable in the sitting position or with the head and shoulders decidedly elevated. Vibrations from the pulsation of the carotid arteries and their branches in the vicinity of the ears may be audible. The attack may last a few minutes to an hour or more. After the attack the patient is usually exhausted and may obtain restful sleep.

When palpitation is a symptom of organic heart disease, its elimination is dependent upon improved compensation. When palpitation is a neurosis, it is readily corrected by proper adjustments.

Neurocirculatory Asthenia

Definition.—Neurocirculatory asthenia is a disturbance in circulation of neurotic origin characterized by fatigue, breathlessness, palpitation, and pain. The common synonyms are **soldier's heart, effort syndrome,** and **disordered action of the heart.**

Adjustment.—Adjustments are particularly indicated in the upper thoracic area of the spine. Emotional instability and neurasthenic tendencies are benefited by upper cervical adjustments.

Symptoms.—Neurocirculatory asthenia is peculiar in that the condition may be of sudden onset and of severe intensity but of momentary duration. As a rule attacks of thoracic pain, extreme exhaustion, and shortness of breath follow emotional strain or exercise. The voice becomes weak, and in some cases

the patient is unable to produce voice sounds. The attack may terminate after an adjustment or without an adjustment. The patient may be able to resume his work in a few minutes, or he may complain of thoracic discomfort and be conscious of respiratory effort for hours or days. In rare instances there is syncope with pallor. In many cases there is a mild blanching of the cheeks and lips, but in some cases the face is flushed. Freedom from emotional strain, rest, and congenial surroundings and friends react favorably upon the patient and lessen the frequency of recurrent attacks. Drudgery, overwork, seclusion, and pentup emotions induce recurrences. The pulse, heart sounds, and blood pressure reveal no abnormality. Spinal adjustments have succeeded in completely overcoming this neurosis in a large percentage of cases.

Angina Pectoris

Definition.—Angina pectoris is a severe paroxysmal pain of sudden onset occurring in the precordium and often radiating into the left side of the neck and the left arm.

Adjustment.—Upper dorsal adjustments are indicated in angina pectoris. Occasionally it is associated with indigestion, and middle dorsal adjustments which correct the indigestion will dispel the attacks of angina.

Symptoms.—Angina pectoris is also known as the **breast pang, angina of effort,** and the **anginal syndrome.** The term angina pectoris is applied to attacks of thoracic pain related to the heart where the cause of that pain is unknown. When the pain is due to sclerosis, thrombosis, or embolism of the coronary arteries, the condition is named coronary occlusion; in this the pectoral pain is a symptom.

Attacks of periodic chest pain may occur at any age; angina pectoris, however, is more common during middle life and thereafter. The pain of angina pectoris is believed to be due to ischemia of the heart muscle; this may be brought about

by an occlusion of the coronary arteries, a process of arteriosclerosis, a thrombus, or an embolus. It may be associated with aortitis which narrows the orifice of the coronary artery, and it is not uncommon in cases of aortic stenosis and aortic regurgitation.

Functionally angina pectoris may be due to a vasomotor spasm of the coronary arteries. This may be caused by interruption of the flow of vasodilatation impulses through the upper dorsal sympathetics, the condition being an imbalance between vasoconstriction and vasodilatation.

Angina pectoris occurs in attacks. Often these attacks follow a hearty meal or unusual effort. They are less common in the morning after rest and more common toward the end of the day or when the body is exhausted. The attacks of pain are usually recurrent and vary greatly in intensity and duration. The pain usually begins in the precordium or sternal regions; however, occasionally it begins in the epigastrium or the right side of the chest. When mild the pain may remain localized and be of short duration, but in severe attacks it tends to radiate to the left shoulder and arm following the course of the median or ulnar nerve to the finger tips. During the attack of pain the patient avoids movement, has an anxious facial expression, and experiences marked shortness of breath. As a rule the pain subsides in a few minutes after rest. There may be a sense of numbness that prevails for some time. When the pain is not relieved by rest, the condition is apt to be coronary occlusion. Angina pectoris is looked upon as a physiological abnormality, while coronary occlusion is an organic disease; however, aged patients having arteriosclerosis may suffer attacks of angina pectoris which promptly subside on rest. Many of these cases respond to Chiropractic adjustments, and the recurring attacks of pain cease.

The neurotic character of many cases of angina pectoris is revealed by the fact that they may withstand a violent exertion without the development of an attack at one time, while an attack may follow minor exertion at another time. Further-

more, angina pectoris may exist in those who do manual labor, the attacks being infrequent even though the degree of physical exertion is the same day after day.

Coronary Occlusion

Definition.—Coronary occlusion is an obstruction of a branch of one of the coronary arteries either by sclerotic changes, the development of a thrombus, or the lodging of an embolus.

Adjustments.—Adjustments should be made in the upper dorsal and the lower dorsal areas of the spine. Lower dorsal adjustments are of particular importance in renal hypertension and arteriosclerosis, both of which are common predecessors of coronary occlusion.

Pathology.—This condition is most common between forty and seventy years of age. It may develop independent of other discoverable heart disease or may be a development in the course of advanced myocardial disease. Complete obstruction of a large vessel may cause immediate death. The obstruction more often involves a branch of the left coronary artery, the theoretic explanation being that its branches leave the main artery at right angles and enter the myocardium which restricts their movement; hence, when sclerotic or atheromatous changes occur at or near the bifurcation, these branches are less mobile. Obstruction of a coronary branch produces infarction. The part of the heart muscle involved by the infarct undergoes necrosis and absorption and is replaced by scar tissue. The fact that coronary occlusion may occur without the production of symptoms is indicated by the finding of numerous scars at autopsy.

Symptoms.—Coronary occlusion begins suddenly with severe pain in the breast. It occurs without exertion and varies greatly in intensity. The pain is not relieved by rest and may persist for days. The skin is pale, cool, and moist. The pulse is small, rapid, and easily compressible. In severe cases the

pulse is scarcely perceptible and cannot be counted. Cases which survive this initial shock continue to have a rapid, small, arrhythmic pulse. There may be slight fever for a few days. The heart sounds are feeble. After a week the pulse becomes slower and larger, and after several weeks or months of rest the patient may be free from recurrent attacks of chest pain, enjoys life comfortably, but should avoid exertion. The heart muscle has been damaged and even after repair remains a subnormal heart.

The Cardiac Arrhythmias

Contractions of the cardiac muscle arise when the pressure within the wall of the right auricle activates the nerve endings in the sinoauricular node. This node is situated in the wall of the right auricle near the opening of the superior vena cava. The impulse is transmitted from the sinoauricular node to the auriculoventricular node and hence through the bundle of His which bifurcates sending branches into the walls of the ventricles. Thus, impulses traveling through the auriculoventricular node are conveyed to the muscle tissue of the ventricles causing them to contract simultaneously. When this neuromuscular mechanism functions normally, the contractions of the ventricles regularly follow the contractions of the auricles. Alterations in the function of this nerve mechanism causes irregularity of the heart action commonly termed **arrhythmia.** This altered function may be a neurosis caused solely by interference with nerve function. It may also be caused by pathology in the neuromuscular bundle of His, the pathology generally being a part of myocardial disease. It will thus be seen that arrhythmia may exist as a neurosis in a heart which is anatomically perfect or may occur as a symptom in a heart whose structure has been seriously damaged.

Adjustment.—The heart has two sources of nerve supply, the vagus which is chiefly inhibitory and the upper thoracic sympathetics which are activating and control the metabolic

process. Adjustments may, therefore, be necessary in the upper cervical or in the upper thoracic regions of the spine.

SINUS ARRHYTHMIA is an irregularity in the rate of the pulse due to a variation in the time of the diastoles of the heart. It is most common in children about the time of puberty and is most prominently observed during forced respiration. During inspiration the rate of the heart may increase, and the time of the diastoles is shortened. During expiration the pulse rate is reduced, and the time of the diastoles prolonged. The duration and force of the ventricular contractions may remain constant, or they too may be markedly altered. **Sinus bradycardia** is a sinus arrhythmia in which the heart rate is reduced, and **sinus tachycardia** is the term applied when the rate is increased. Bradycardia denotes a pulse rate under 60 and tachycardia a pulse rate in excess of 100. Bradycardia is caused chiefly by upper dorsal subluxations which interfere with the function of the sympathetic nerves, they being the activators of the heart. Tachycardia is principally caused by upper cervical subluxations which interfere with innervation of the heart through the vagus.

EXTRASYSTOLE is frequently called **premature systole** or **premature contraction of the heart.** Bowditch's law of maximum contraction holds that when a stimulus of sufficient intensity to bring about a contraction develops in the heart, the heart muscle responds with all the contractibility of which it is capable at the moment. The heart muscle also possesses a refractory period during which it normally is not susceptible to stimulation or during which it responds only to a very strong stimulus. Extrasystoles are the result of impulses which arise in the auricle or ventricle wall causing a portion of the muscle fibers to contract, the remaining musculature being refractory at that time. Should the next regular impulse arrive when the ventricle is in the refractory phase, it will not respond to this regular impulse; hence, the impulse conveyed from the auricle is wasted. The period of disturbed

rhythm is equal to the time of two cardiac cycles of the usual rhythm.

Generally the extrasystole is inefficient and may fail to cause a pulse wave in the radial artery or even open the aortic valve. However, if it should be strong enough to do these, the pulse, palpable at the wrist, will be small as compared with other arterial pulsations. The heart sounds of the extrasystole correspond to the intensity of the contraction: when the aortic valve is opened, there will be two heart sounds as in a normal cardiac cycle, only of less intensity; but if the valve does not open, the first sound alone, caused by vibrations within the ventricle, will be heard. When extrasystole develops in a case of aortic stenosis, the murmur may not be audible during the extrasystole because of the diminished intensity of the vibrations.

Extrasystoles may occur in both early and late life with or without organic heart disease. In young people generally it is of neurotic origin and readily corrected by adjustments. Frequently it is associated with attacks of palpitation and often occurs in those who use tobacco, tea, or coffee to excess. In attacks of indigestion and cases who have high blood pressure extrasystole is also commonly encountered. In old age it more often denotes the beginning of myocardial degeneration. Exertion, fatigue, mental strain, and indigestion may accentuate this arrhythmia.

PAROXYSMAL TACHYCARDIA is a rapid heart rate, varying between 100 and 200 per minute, occurring in periodic attacks which have sudden onset and termination. This condition represents a series of extrasystoles arising within the auricle or ventricle when there is an imbalance in the normal dual nerve control. The pulse is intermittent and can be detected either by palpation of the radial artery or during the taking of blood pressure when the mercury level is within the range of the pulse pressure. The attacks vary from a few seconds to several days. Often in young people the paroxysms

are of short duration and constitute a neurosis as there may be no organic disease of the heart muscle. In severe cases occurring in older people there may be organic disease; and the patient will be conscious of forceful rapid heart action, weakness, breathlessness, and thoracic discomfort. After an attack there may be no physical signs. Examination during the paroxysm will reveal short, sharp heart sounds. Dilatation of the heart with passive congestion of the lungs and general edema may be the termination in serious cases. Attacks of tachycardia may continue for years and are not incompatible with long life.

AURICULAR FLUTTER is a rare form of arrhythmia in which the auricles contract rhythmically at a rate of 200 to 400 per minute, and the ventricular contractions are about 100 per minute. Auricular flutter is a condition of heart block, and the ventricular rate may be one-half, one-third, or one-fourth of the auricular rate. The rate of the auricles and ventricles is constant, and there is no variation in the ratio of the auricular rate to the ventricular rate. This condition may continue for months, possibly years. It may give way to auricular fibrillation and a change in the ratio of the heart block. Symptoms which arise in this condition are those of a failing heart. The condition is usually detected by the electrocardiograph.

AURICULAR FIBRILLATION is a condition in which there is no complete auricular systole. Individual bundles of muscle fibers of the auricle, independent of each other, contract in response to stimuli. Instead of an auricular systole, there is a series of rapid and incomplete contractions which maintain high pressure within the auricle, yet these contractions are not transmitted to the ventricles. Auricular fibrillation is commonly encountered in advanced mitral stenosis; when it occurs, the presystolic murmur of mitral stenosis becomes diastolic. This condition is an indication of myocardial failure. The common symptoms, therefore, are fatigue, breathlessness, thoracic discomfort, vertigo, choking sensations, and often

numbness; the pulse rate is invariably over 120 per minute. Proof of fibrillation is shown in the electrocardiogram.

HEART BLOCK is also called **Stokes-Adams syndrome** and **Stokes-Adams disease.** Heart block is the result of an impairment in the bundle of His which causes a delay or prevents the conduction of the impulse from the auricles to the ventricles. When all impulses are prohibited from passing to the ventricles, the condition produced is **complete heart block.** In complete heart block the ventricles contract in response to stimuli arising within their walls and thus establish their own rhythm which is usually 40 per minute or less.

Partial heart block is the condition in which there is a delay in the conduction of the impulses from the auricle to the ventricle. Every second, third, or fourth impulse may be carried through the conducting mechanism. This causes the rate of the ventricles to be one-half, one-third, or one-fourth the rate of the auricles. In partial heart block the pulse rate is slow, usually 40 or less per minute. Damage to the bundle of His may result from myocardial degeneration, the action of digitalis, or interference with nerve currents through the upper dorsal sympathetics.

All cases of heart block experience some symptoms of a failing heart, particularly weakness, dizziness, and fatigue upon exertion. More severe cases have attacks of syncope or even convulsions. The pulse is slow because the ventricular contractions are one-half, one-third, one-fourth, or possibly one-fifth of the auricular rate. If there is a venous pulse observable in the neck, the auricular rate can be counted by careful observation of those pulsations. In two to one block the pulse rate is usually near 40; in three to one rhythm the pulse rate is more likely to be about 30; while in severe cases the ventricular rate may fall to eight or ten ventricular contractions per minute. Heart block in the aged may be assumed to be due to myocardial degeneration. Early in life it may be

of syphilitic origin or may be a neurosis in the conduction which will respond to proper cervical and dorsal adjustments.

ALTERNATION OF THE HEART is a condition in which alternating contractions of the ventricles propel different amounts of blood into the arterial system. This causes one pulse wave to be large and the succeeding pulse wave to be small: the result is a bigeminal pulse. The condition is quite readily detected in measuring the blood pressure: with the mercury at the systolic level the heart rate will be one-half of that which can be counted at the diastolic level. The apex beats alternate in force as detected by palpation. On auscultation the sounds alternate in intensity, corresponding to the size of the pulse wave. When there is alternation of the heart in the young in which the pulse is rapid, it is often regarded as being temporary and not serious. When associated with uremia, advanced hypertension, angina pectoris, and myocarditis, it is looked upon as a grave symptom. Those cases rarely live two years after the onset of the alternation, and in many instances death is sudden.

DISEASES OF THE ARTERIES

Arteriosclerosis

Definition.—Arteriosclerosis is a degeneration of artery walls characterized by fatty, fibroid, and calcareous changes. Similar degenerative changes in the walls of a vein are called **phlebosclerosis.** The term **angiosclerosis** denotes that degenerative changes which destroy the elasticity of vessel walls prevail in arteries, veins, and capillaries.

Adjustment.—Sclerosis of the vascular system may occur in old age, be associated with hypertension, or follow intoxications and infectious diseases. This would seem to indicate that defective elimination favors sclerotic changes, while efficient elimination would retard or prevent such changes. Lower dorsal adjustments which normalize kidney function are highly important in all cases of arteriosclerosis. Additional

local adjustments that will aid proper elimination of metabolic ash should be made.

Pathology.—In old age localized degenerative changes occur in the tunica intima of some arteries. These degenerative changes may be fatty and fibroid. Minute deposits of fat occur in the muscle cells of the heart. Crystals of cholesterol and calcium accumulate in the disabled cells which are incapable of expelling crystalloids. In due time there are elevated yellowish patches upon the inner lining of the larger arteries and at the orifice of their branches. These patches undergo softening and may ulcerate, predisposing to the formation of thrombi. This damage to the artery wall may permit its stretching and the development of an aneurysm. Senile scleroses are common in the large arteries and those of the brain. When hypertension precedes sclerosis, the small arteries and arterioles are the site of the first sclerotic changes. These vessels in all parts of the body undergo change. The symptoms result from deficient food and oxygen reaching the organs supplied by the sclerotic vessels or from the development of thrombosis or embolism.

Symptoms.—Arteriosclerosis is a degenerative change which is by no means confined to the arteries, veins, and capillaries. It invariably involves the heart muscle which may undergo fatty and fibroid changes, seriously damaging it as an efficient pump. These changes develop slowly over a period of many years. The degree of sclerosis and the efficiency of the damaged organs depend upon the quality of tissue inherited, the innervation of the tissues, the nature of the materials ingested, and the disposition of the tissues' end products.

Arteriosclerosis may be advanced before detected. The early symptoms may not suggest the existence of vascular disease: they consist of emotional instability, irritability, failure of memory, and fatigue. Most patients lose weight and their skin becomes wrinkled. The blood pressure varies: when the heart is but slightly damaged by degenerative changes, the blood

pressure may be considerably elevated; when both heart and arterial changes are extensive, the blood pressure may be actually below normal. The average patient usually recognizes the existence of three symptoms: namely, that he is easily fatigued, has a failing memory, and has impaired judgment. Examination of the eyes will show tortuous arteries in the fundus of the eyeball: the diameter of both arteries and veins in the eye are variable. Some of these cases of arteriosclerosis are subject to recurrent attacks of angina pectoris, palpitation, severe vertigo, and shortness of breath. Other cases may be associated with arthritis which diminishes activity: joints may be enlarged, painful, and subject to limited motion; the muscles diminish in size and in tone.

Arteriosclerosis is the usual cause of claudication which is brought about by deficient blood supply to the muscles of the legs. In intermittent claudication walking or standing induces a paresthesia of the lower extremities which is attended by painful muscular contractions, tremors, and perspiration. The attacks recur upon use of the legs because the sclerosed vessels, while providing for ample flow of blood with oxygen and nutrition during rest, fail to meet the additional demand during effort. Hence, rest relieves the discomfort but does not modify the obstruction.

A systolic murmur is frequently audible in the aortic area and transmitted to the neck; this may result from a roughening of the valve segments of the orifice, and it may occur without producing actual stenosis. The heart tends to hypertrophy in the early stages and may dilate in advanced stages; in case of the latter the symptoms of congestive heart failure appear. The pulse is small and is named pulsus tardus. The artery wall feels hard from which it derives the names "whip cord" artery and "pipe stem" artery.

Chronic interstitial nephritis is frequently an associated condition. Early there may be nothing more than polyuria; the urine is pale in color and of low specific gravity. At times there may be traces of albumin; however, in advanced cases

casts and kidney cells are discoverable on microscopic examination. When the heart, arteries, and kidneys are affected, the condition is frequently termed cardiovascular-renal disease. The cardiac component consists of myocardial changes, the vascular component of sclerotic changes in the arteries, and the renal component of chronic interstitial nephritis.

Arteriosclerosis may result in coronary occlusion, apoplexy, aneurysm with or without rupture, thrombosis, embolism, and gangrene.

Aneurysm

Definition.—An aneurysm is a circumscribed dilatation of an artery. It may be saccular, cylindrical, or fusiform in shape. A dissecting aneurysm is one in which the tunica intima is ruptured and blood is forced between the intima and media. The aneurysmal sac is formed by the two outer layers of the artery wall. An arteriovenous aneurysm is an abnormal communication existing between an artery and a vein.

Adjustment.—The anatomical changes in the artery wall of an aneurysm preclude correction; yet many sufferers of aneurysm obtain relief and are decidedly benefited by adjustments of the seventh cervical or upper dorsal. Concussion of the seventh cervical spinous process increases activity of the vasoconstrictor cells lying at that level in the spinal cord. This diminishes the diameter of the aneurysm and affords at least temporary relief.

Pathology.—Aneurysms are generally found in the aorta but may affect the walls of other arteries, such as the iliac or femoral. In most instances the wall of the artery has been damaged by a disease process, such as aortitis or arteriosclerosis. When strain causes an elevation in blood pressure, the weakened arterial coats become stretched. Previous damage by a disease process prevents the stretched structures regaining their normal tonus. A small aneurysm in the cerebral arteries may be little larger than a pea, while aneurysm of

the thoracic aorta may attain the size of an orange or grapefruit. The damaged wall of an artery may attempt reparation by means of new connective tissue: this is usually accompanied by the production and deposition of fibrin within the aneurysmal sac. The fibrin may appear as stratified layers which are undergoing organization.

Pulsations against adjacent organs often lead to erosion, while pressure may cause obstruction.

Symptoms.—The symptoms vary greatly according to the size and position of the aneurysm. An aneurysmal tumor of considerable size may occupy a portion of the pleural cavity alongside of the spinal column without producing symptoms other than those caused by friction of the pulsating mass. In due time this would create pleurisy and spinal pain because of erosion of the vertebral body and connecting ligaments.

Aneurysm of an iliac artery may cause erosion of the body and transverse process of a fourth or fifth lumbar vertebra. Symptoms arising therefrom may be suggestive of lumbago.

Aneurysm of the descending aorta may cause caries of the vertebral bodies with severe wedging and the development of acute angular kyphosis. This condition may be mistaken for Pott's disease.

Aneurysm of the ascending aorta may cause a downward displacement of the heart, pleurisy in the anterior mediastinum, and erosion of the sternum near the level of the second costal cartilage.

Aneurysm of the transverse aorta may cause dyspnea from pressure upon the bronchi, dysphonia or aphonia from pressure upon the recurrent laryngeal nerve, and dysphagia from pressure upon the esophagus. Pressure of an aneurysm upon either vena cava will cause edema in the areas drained. Aneurysm of the transverse aorta causes wide difference in the blood pressure as obtained from the right and the left arm; in some cases this variation in blood pressure is the first suggestion of aneurysm. It is not uncommon for aneurysm of the transverse aorta to cause inequality in the size of the pupils;

this results from pressure upon the upper dorsal sympathetics which supply the dilator pupillæ muscle. Tracheal tug is held to be pathognomonic of aneurysm of the transverse aorta, especially when the aneurysmal sac is adherent to the right bronchus or trachea. Tracheal tug is detected by placing the fingers on each side of the larynx and pressing slightly headward. The pulsations of the aneurysm are synchronous with the downward movement of the larynx.

Aneurysm may involve the abdominal aorta. When located below the diaphragm, the aneurysm produces pressure symptoms which are referred to the spine and the digestive organs. The pulsating aneurysm may be palpable through the abdominal wall.

Physical examination may reveal evidences of an aneurysmal tumor, for the presence of signs depends upon the location of the aneurysm. Inspection may reveal edema of the upper or lower extremities and enlargement of the veins in the neck. Palpation may reveal a pulsation particularly in abdominal aneurysm, but occasionally vibrations are palpable through the anterior chest wall. A systolic thrill may be palpable as is the tracheal tug. Careful percussion will reveal dullness over the area of the enlargement, particularly above the level of the third ribs in aneurysm of the thoracic aorta. In rare instances a systolic murmur is audible over the area occupied by the aneurysm. If the aortic valve of the heart is involved, an accompanying murmur is usually audible at the aortic area. Fluoroscopic examination is most useful in detecting the existence and location of the aneurysm. While a radiographic picture may show an opacity, the fluoroscope enables one to determine that the opacity pulsates.

SECTION IV—CHAPTER XIII

EXAMINATION OF THE NERVOUS SYSTEM

In the examination of the nervous system the case history plays one of the principal roles. In obtaining this record it is best first to gather general information regarding the character of the complaint as this enables the examiner to become oriented to the nature of the diagnostic problem. Then the up-to-date progress of the affection should be meticulously acquired, beginning at the time of its inception—this may require considerable cross examination and observation.

During the compilation of the case history the examiner should be aware of the mental state of the patient, at the same time noting the degree of consciousness, as somnolence, stupor, coma, or delirium. Questioning will reveal whether the patient comprehends language and ideas. A study of the facial expression is of value in that it discloses intelligence, stupidity, emotional states, and pain; this is particularly important in such diseases as paralysis agitans in which the facial expression is masklike and in myxedema in which it is moon-shaped. By observation and conversation one learns the existence of delusions, illusions, and hallucination; these disturbed states are often encountered following damage to the brain by pathologic changes and toxemias.

In examination of the cranial nerves a thorough knowledge of their functions, whether motor or sensory, is essential to determine the presence or location of a lesion along the course of one of these nerves. Simple tests have been devised to show the degree of function of all cranial nerves, some of which are so discriminatory as to designate exact locations of interrupted communications between brain centers and the peripheri.

Paralysis is a condition in which there is loss of use of a muscle. It is caused by a deficiency of motor nerve impulses

4 fibers of pyramidal tract.
(1) corticobulbar
(2) " spinal
(3) " pontile
(4) " tectal

which impairs the tonus and use of the muscle. Complete and partial are degrees of paralysis. A paralysis affecting both sides of the body is referred to as a diplegia, that affecting one side as hemiplegia, that affecting the two lower extremities as paraplegia, and that affecting but one extremity as monoplegia. A spasm is a muscular contraction involving one muscle or a limited group of muscles. Convulsion is a contraction or series of contractions involving the voluntary muscles of the major portion of the body. Spasms and convulsions may be either tonic or clonic. Fibrillary twitching is a minor disturbance created by a contraction of a small bundle of muscle fibers; these minute contractions are involuntary and usually recur at irregular intervals. Choreiform movements are gross spasmodic movements often described as being purposeless. They receive their name because of their occurrence in chorea. Tremors are involuntary rhythmical contractions of alternating groups of muscles. They may be fine or coarse. In exophthalmic goiter the tremor is fine and rapid; in Parkinson's disease it is relatively slow and coarse. Intention tremor is one which occurs only at the time the patient makes a voluntary movement. All tremors subside during sleep.

Lower Motor Neuron Paralysis

Lower motor neuron paralysis results from damage to the peripheral nerve or its cell body. This type of paralysis is flaccid and usually accompanied by atrophy; the deep reflexes are lost; and the paralysis may be limited to a single muscle or a group of muscles. Examples of lower motor neuron paralysis are those resulting from peripheral neuritis and anterior poliomyelitis.

Upper Motor Neuron Paralysis

Upper motor neuron paralysis results from damage to the upper motor neuron cell body which lies in the motor cortex of the brain or to its axon which enters into the formation of

Precentral gyrus.
Corona radiata
internal capsule (Genu part)
Cerebral peduncle (middle ⅗ part)
Pons
Medulla (pyramids)

lat ventral spinal
ant "

the pyramidal tracts of the spinal cord. The affected muscles have increased tonus; they are spastic and do not atrophy; reflexes are exaggerated; and Babinski's sign replaces the normal plantar reflex.

The gaits characteristic of diseases of the nervous system are described in Section One and should be restudied at this point.

Reflexes

Reflexes are of diagnostic importance. A reflex is defined as an action caused by the transformation of an ingoing sensory impulse to an outgoing motor impulse. When the periphery of a sensory nerve is irritated by an adequate stimulus, the impulse, arising in that nerve travels centralward to the spinal cord or medulla. Through a synapse a portion of these impulses may be transferred to motor cells which conduct the impulses to muscular tissues. Contraction of a muscle induced in this way is known as a **motor reflex.** The elapse of time between the application of a stimulus and the performance of the muscle is appreciable to the eye. It may occupy but one-tenth of a second. The reflexes are divided into two groups: the superficial or cutaneous and the deep or tendonous.

Superficial Reflexes

The superficial reflexes are tested by stroking the skin with the finger or a pointed stick, such as a toothpick, or by pinching or pricking the skin.

The **conjunctival** reflex is produced by touching the cornea. The normal response is closure of the eyelids. Their failure to close would indicate disease in the pons or injury of the facial nerve.

The **pharyngeal** and the palatal reflexes are elicited by touching the wall of the pharynx or the soft palate. Normally the pharynx responds by contracting, the soft palate by elevating. Failure to secure this reflex indicates disease in the medulla.

The **scapular** reflex is produced by stroking the skin along either side of the spine between the two scapulæ. The scapular muscles respond by contracting. Failure to secure this reaction may indicate disease of the spinal cord or of the spinal nerve between the fifth cervical and first dorsal.

The **epigastric** reflex is produced by stroking downward from the nipple. The response is a slight contraction of the muscle fibers in the epigastric region. This reflex passes through the spinal cord from the fourth to the ninth dorsal vertebræ.

The **abdominal** reflex consists in a contraction of the abdominal muscles when the skin immediately below the costal margin is stroked downward. This reflex passes through the spinal cord between the eighth and twelfth dorsal vertebræ.

The **plantar** reflex is produced by stroking the sole of the foot from the heel forward. The great toe becomes plantarflexed normally. This normal action is dependent upon the integrity of that part of the spinal cord whose nerves emerge between the third lumbar and the second sacral segment.

Gordon's reflex is produced by deep pressure over the calf of the leg. It produces dorsiflexion of the great toe.

Oppenheim's reflex is produced by stroking downward along the inner side of the calf and produces dorsiflexion of the great toe.

Of these superficial reflexes the plantar reflex is of greatest practical use. For best results the patient should be in the recumbent posture and the extremity partially flexed at the hip and knee. The sole of the foot should be gently stroked from the heel to the toe with a pencil or stick. In normal individuals the great toe will be flexed toward the sole of the foot, excepting in young children who have not yet learned to walk. If the great toe becomes dorsiflexed as in Gordon's reflex and in Oppenheim's reflex, it indicates pathology in the pyramidal tracts of the spinal cord. Dorsiflexion of the great toe when the sole of the foot is stroked is known as **Babinski's reflex** or **Babinski's sign.**

The Deep Reflex

Jaw jerk or the jaw reflex is produced by tapping the lower jaw with the mouth half open. The tapping may be done with the finger. The normal response is that the jaw closes. This action is dependent upon a normal motor nucleus of the trifacial in the pons.

The triceps reflex is produced by extending the arm from the body with the forearm hanging downward. The patient's arm should be supported under the elbow by the forearm of the examiner. In this position a tap on the triceps tendon normally causes the triceps muscle to contract and extend the forearm. This reaction is dependent upon the integrity of the fifth, sixth, and seventh cervical nerves and that portion of the spinal cord from which they arise.

The wrist reflex is produced by tapping the flexor tendon at the wrist. In response the fingers are slightly flexed. This result depends upon the normality of the sixth cervical to the first dorsal nerves and the spinal cord from which they arise.

Knee jerk is also known as the patellar reflex. It is the most important of the deep reflexes. To elicit this reflex the knee should be crossed and the leg hang down in a relaxed condition. If the patient is in bed, the leg may be supported by the forearm of the examiner which is placed in the crook of the knee and allows the leg to swing on the forearm. The patient's attention should be diverted from the test. The patellar tendon should be tapped between the patella and the tubercle of the tibia. Under normal conditions there is an abrupt jerk of the leg or forward kick of the foot. This response is secured in fully 98 per cent of normal people. Diminished knee jerk may indicate nothing more than diminished nervous energy in fatigued people. The chief organic causes for diminished knee jerk are degenerative changes in the posterior columns, the posterior horns, and the anterior horns of the spinal cord. Exaggerated knee jerk often occurs in the early stages of neu-

rasthenia and in highly nervous people during mental stress. Its chief organic cause is pathology in the pyramidal tracts of the spinal cord or in the motor area of the brain. When due to brain lesions the exaggeration is usually limited to the side of the body affected which is opposite the side of the brain having the lesion. When exaggerated knee jerk is bilateral, its cause is usually in the lateral columns of the spinal cord. Exceptions to this are found in infantile cerebral palsy, cerebral ataxia, and general paralysis of the insane.

Ankle jerk has the same diagnostic importance as knee jerk. To test the ankle jerk the patient's leg should be extended, and the foot should be held in such a manner as to bend it upward and stretch the tendon of Achilles. Striking this tendon results in a contraction of the calf muscles which causes plantarflexion of the foot. If, when the tendon is struck, the calf muscles undergo a rhythmic contraction or series of contractions, the reflex is called ankle clonus. In other words, ankle clonus is an abnormal ankle jerk or ankle reflex. This may also be detected by forcefully flexing the foot toward the leg; the calf muscles will then undergo a series of rhythmic contractions. Excessive ankle jerk and ankle clonus are found in the same diseases having exaggerated knee jerk—chiefly affections of the lateral columns of the spinal cord and the motor area of the brain.

Special Senses

The integrity of the nerves of special senses may be estimated by testing the acuteness of smell, vision, hearing, taste, and feeling. In the diagnosis of nervous diseases the reactions of the eye are of particular importance. Normal sensitivity of the cornea to touch is lost in the severe degrees of unconsciousness as is the reaction of the pupil to the stimulus of light. Examination of the eyes should note such abnormalities as strabismus, conjugate deviation, miosis, mydriasis, and the Argyll Robertson pupil. Heat and cold must be used to determine the temperature sense. Position of a part, direction

of movement, or the judging of weight may be employed in the evaluation of the muscular or knee-joint sense. A sharp pointed instrument is useful in determining an analgesia.

Brown-Sequard Paralysis

Brown-Sequard paralysis results from a lesion destroying one lateral half of the spinal cord. There is flaccid paralysis of the muscles on the same side as the lesion and at the level of the lesion due to damage of the lower motor neuron cells in the anterior horn. The loss of the tactile, temperature, and pain senses in the same area is caused by damage to the nerve fibers of that zone entering the posterior nerve root. On the same side but below the level of the lesion there will be spastic paralysis with exaggerated deep reflexes; this is caused by a destruction of the pyramidal tracts which convey inhibitory impulses to the motor cells of the anterior horn. Likewise, there is loss of the muscle sense which includes the sense of position, direction of movement, pressure, and deep vibration. Tactile sense is not lost but is somewhat impaired. On the opposite side of the body below the lesion there is loss of sensation for temperature, pain, and touch due to the fact that these sensations are conveyed upward through the opposite side of the cord. There are no motor disturbances on the side opposite the lesion.

CHAPTER XIV

DISEASES OF THE NERVOUS SYSTEM

Epilepsy

Definition.—Epilepsy is a disease of the nervous system characterized by loss of consciousness with or without convulsions.

Epilepsy is not associated with any constant pathological change; however, some cases do have structural alterations in

various parts of the body, such as cerebral hemorrhage, brain tumors, thickening of the meninges, and consequent atrophy of the underlying brain. Other cases have disorders of gastric and intestinal digestion. Stokes-Adams syndrome which is sometimes by mistake termed epilepsy is associated with heart block. Other cases termed epilepsy may be associated with worms, impacted molar teeth, or phimosis. In view of these facts it can be said that epilepsy is not a specific disease but rather a condition having recurrent convulsive seizures due to a wide variety of bodily conditions. In some nervous individuals the resistance at synapses is low; consequently, almost any stimulus acting upon a peripheral sensory nerve may become an active stimulus and overcome the resistance offered at the synapse. This then causes a bombardment of the voluntary muscle by efferent motor impulses.

Adjustment.—The cause of epilepsy must be removed in order to obtain results. Spinal causes are commonly found in the upper cervical region of the spine and less commonly found in the dorsal, lumbar, or pelvic spine. Nerve pressure at a middorsal subluxation or nerve tension due to an anterior coccyx are not uncommon provocating stimuli of epilepsy. Nerve irritation due to an impacted molor requires dental correction and that due to phimosis surgical correction.

Symptoms.—There are two forms of epilepsy—grand mal and petit mal. The grand mal is a temporary loss of consciousness with a convulsion, while the petit mal is a transitory loss of consciousness without a convulsion.

The grand mal may be preceded by premonitory symptoms which vary in nature and intensity. These premonitory symptoms may be spoken of as an aura. The aura may consist of malaise, mental depression, vertigo, sensations of numbness, or a mist arising around the body. In a typical case of the grand mal the aura is immediately followed by an articulate or inarticulate cry with the ensuing convulsion. The first part of the convulsion is tonic and varies from a few seconds to

one or two minutes in duration. The trunk is rigid; the extremities are extended; while the hands and jaw are firmly closed. The respiratory muscles are immobilized, and cyanosis develops as a consequence. The tonic convulsion gives way to the clonic, and during the clonic phase flexor and extensor muscles alternately contract, producing rhythmical movements. The action of the tongue whips the saliva into foam which is often bloodstained from biting the tongue. The head may be rolled from side to side or repeatedly raised and dropped striking the floor. After a few minutes the frequency and force of the muscular movements are reduced, and the patient passes into a stuporous state commonly called **epileptic coma.** The coma lasts about thirty minutes and is followed by severe headache, mental sluggishness, and disordered thought. Mental dullness may persist for two or three days. The seizures recur with more or less regularity and varying frequency, some being daily, weekly, monthly, or less often. It is not uncommon for a convulsion to be initiated by emotion. Epileptic attacks may arise from congenital defects or may be acquired, most commonly between the ninth and twentieth years. When the paroxysms are infrequent, the mentality of the patient is not materially affected. Severe cases, however, manifest mental dullness, slowness of thought, poor memory, defective reasoning, inability to concentrate, and in extreme cases mental deterioration or insanity.

In the attacks of grand mal in children under ten years of age the convulsion is usually atypical. It may be predominately clonic or tonic and clonic in nature being of long duration. In some cases what appears to be a protracted convulsion is a series of rapidly occurring miniature convulsions, the intervals elapsing between convulsions being so short that they are frequently overlooked. Continuous convulsions of this type have been known to exist for one to seven hours.

The minor attacks of epilepsy are known as the **petit mal** and have only a temporary loss of consciousness with no convulsions. The loss of consciousness may be of a moment's dur-

ation on may continue for several seconds. The subject usually stops and stares but does not fall. The facial expression becomes temporarily fixed, but occasionally there may be slight twitching of a few muscles. The entire attack has the duration of a few seconds. These patients always have knowledge that something transpired of which they are not fully aware but do not remember happenings which occurred during their moments of unconsciousness. Some patients have premonitory sensations which normally gives them warning and enables them to be seated during the period of unconsciousness. A case of epilepsy may have attacks of grand mal or petit mal or both. Usually the attacks of petit mal are more frequent than attacks of grand mal.

Status epilepticus is a condition characterized by a series of rapidly recurring attacks with no return of consciousness between the attacks. The number of convulsions varies from a dozen to a hundred. There is profound stupor or coma throughout and following the attack. The temperature may be above normal. The pulse is extremely rapid and often dicrotic. Death usually follows from dilatation of the heart with pulmonary edema. Cases which regain consciousness slowly, may have relapses, and usually have permanent disabilities.

Psychical epilepsy most commonly occurs in those subject to attacks of the grand mal. The attacks are attended by maniacal excitement, violent temper, temporary insanity, and sometimes attempted crime. These attacks occasionally occur as a substitution for the convulsion and are spoken of as the **epileptic equivalent.** Because no convulsion is present, it is classified as a variety of petit mal.

Jacksonian epilepsy is not a special form of epilepsy, nor is it related to this disease. The term is applied to spasmodic contractions of a muscle, a group of muscles, or an entire extremity without the loss of consciousness and is due to a lesion

in the cortex of the brain. It is commonly found in brain tumors.

Migraine or Hemicrania

Definition.—Migraine is a chronic disease of nervous origin characterized by severe unilateral headaches, disorders of vision, and bilious vomiting.

Pathology.—There is no known pathology which is causative of migraine. The intense throbbing headache indicates there is dilatation of the cerebral arterioles. In all probability this is a vasomotor reflex.

Adjustment.—There are three spinal factors to be considered in migraine. First, a disrelationship between the condyles of the occipital bone and the atlas may cause nerve interference which creates the nervous tendency and is considered as the primary cause. Second, middorsal nerve pressure may impair the tone of the pyloric valve and diminish the efficiency of the stomach as a digestive organ. Small quantities of bile enter the stomach and become difficult to expel after mixing with the gastric juice. Third, lower lumbar nerve pressures may disturb function of the pelvic organs or colon. Hence, pelvic congestion is frequently present during the attack of migraine, and reflexly this may disturb function of the entire alimentary tract. Nerve pressure caused by lower lumbar or sacral subluxations may impair peristalsis of the lower bowel producing intestinal stasis and a resulting copremia. Emotional instability which attends excitement, fear, or worry often acts as an exciting cause and is frequently followed by the attack of migraine.

Symptoms.—The attack may begin with headache or may be preceded by a feeling of mental depression, heaviness over the eyes, fatigue, or other vague sensations. The headache may begin at the base of the skull or the forehead or over the entire side of the head. When the headache starts at the base of the skull, it radiates forward to the forehead until severe

in the lateral half of the head. The pain may be confined to one side of the head or become diffuse over both sides. In every individual the attack begins in the same manner each time. The severe, throbbing headache is increased upon stooping, jarring, or having the vibrations of loud noises strike the eardrum. The eyes are highly sensitive to light, and there may be dimness in the visual field. Most patients complain of flashes of light before the eyes occurring in spots or zigzag lines; this becomes an annoying symptom and compels the patient to select seclusion in a darker room. Nausea is a constant symptom and is increased upon assuming the vertical position. Vomiting occurs repeatedly, and the vomitus consists of gastric juice and bile. Patients who cannot empty the stomach contents have repeated attacks of retching which intensifies the headache and exhausts the patient. The attack may vary from a few hours to a few days. Attacks are most common at or near the menstrual period or after mental strain. The attacks tend to increase in frequency with age. Occasionally they terminate at the menopause. Men are affected less frequently, and usually those who do have attacks work under high pressure and are subject to mental strain.

Hysteria

Definition.—Hysteria is a neurosis involving the nervous system and is characterized by excitability, mental depression, and loss of the emotional control. Literally the word hysteria means a condition of the womb, and it was formerly thought to be a result of unknown uterine disease.

Adjustment.—The primary cause of hysteria undoubtedly is nerve interference in the upper cervical portion of the spine. There may be associated conditions which require local adjustments to correct the dysfunction. Local subluxations capable of contributing to the cause of hysteria may be in any portion of the spine. The lumbar innervation of the pelvic organs should not be overlooked since hysterical attacks are more common near the menstrual period.

Hysteria is classified as a psychoneurosis for which there are two attempted explanations. One school of thought maintains that psychoneurosis has a psychical origin. The other school contends that the abnormal working of the mind and of the nervous system is the result of biochemical or endocrine disturbances incapable of detection. The former group holds that most of those afflicted have hereditary tendencies which make them susceptible to the development of a complex that is understood to be an unconscious grouping of ideas charged with emotions. It is claimed that these complexes influence the functions of both mind and body. Those who adhere to the physiological theory contend that excessive stimulation or inhibition interferes with the passage of impulses over synapsis, and this gives rise to dissociation at both high and low psychic or physiological levels. Exhaustion, fatigue, trauma, intoxications, infections, and emotional shock are conditions which may act as stimulants or depressants. Further, it is maintained that the endocrine products influence mind and body as is so clearly evidenced in hypothyroidism and dyspituitarism.

Visceral functions are controlled by the vegetative nervous system. Upper cervical subluxations may impair the function of the cranial parasympathetics, while dorsal and lumbar disrelationships may impair the function of the sympathetics as well as influence somatic nerves. It would seem more reasonable to attribute the symptoms of hysteria to disturbances of the nervous system than to imagination.

Symptoms.—Two forms or degrees of hysteria have been noted: major and minor or severe and mild.

Most hysterical patients are sensitive and irritable. They frequently are subjects of headache, poor appetite, and hyperesthesia. An attack of **hysteria minor** is preceded or accompanied by emotional instability. The attack may begin with laughter or weeping. The face may be flushed, but the pulse rate and blood pressure remain within normal range. There

may be senseless talking, indicating the patient is the subject of hallucinations. Globus hystericus is invariably present. The patient may appear to collapse, and the eyes may be closed. The eyeballs are usually rolled upward; the cornea is sensitive; and all reflexes react normally. These patients crave sympathy and flattery which when freely given tends to prolong the attack.

Hysteria major may be preceded by an attack of hysteria minor during which there is often involuntary voiding of urine. The major attacks have a pseudoconvulsion. In falling patients do not create serious blemishes nor do they foam at the mouth or bite the tongue. The limbs are usually extended; the hands closed; and there are muscular contractions which are not rhythmical. They are said to be intentional and under the control of the will, but at the moment the patient is unable to exercise his or her will. Some patients scream, while others pull their hair. Many hysterical patients complain of intense pains which may be located in nearly all parts of the body; however, it is usually self-evident that the description of these pains is exaggerated.

Hysterical paralysis may affect one or more extremities, most often there being hemiplegia. The affected muscles are somewhat hypertonic, yet they are neither flaccid nor spastic. There may be manifestations of catalepsy in which a part of the body is suspended in any position in which it is placed and not moved by the patient. In hysterical paralysis there is no atrophy, but at times there is edema and cyanosis indicating disturbance of the vasomotor system. An extremity may be maintained in a fixed position for weeks or months and be capable of normal use when the spasm ceases.

During the major attack of hysteria the patient is conscious: he can hear what is said and responds to stimuli. A hysterical convulsion may be followed by a so-called hysterical coma or stupor. Since the loss of consciousness is incomplete, the patient may be aroused by the application of strong pain-

ful or uncomfortable stimuli. Excessive attention and petting prolong the attacks, while inattention sometimes terminates them.

Neurasthenia or Nervous Prostration

Definition.—Neurasthenia is commonly called **nervous exhaustion.** It is an affection of the nervous system characterized by physical or mental inefficiency.

Adjustment.—Upper cervical adjustments should be given in all cases. Other local nerve pressures may contribute; therefore, they should be corrected wherever found.

Symptoms.—Neurasthenia frequently follows overwork, worry, and prolonged mental strain. From the beginning there are occipital headaches, insomnia, inability to concentrate, and irritability or depression. Many patients have a feeling of cranial constriction similar to that caused by the wearing of a skullcap or a hat band; others complain of pressure upon the top of the head. Rest does not overcome physical fatigue as in most diseases; hence, patients with neurasthenia awaken in the morning exhausted. Nearly all cases have cutaneous hyperesthesia. There may be paresthesias: among the more common ones are tinnitus aurium, vertigo, formication, and sensations of heat or cold. Dysfunction of many organs is not unusual, as palpitation, hyperchlorhydria, hypochlorhydria, polyuria, constipation, or diarrhea. Visual disturbances are very common, and the sense of smell and taste may be altered.

The patient is conscious and thinking continuously of his own difficulties or physical predicament; therefore, few of these patients can be interested in anything other than their own discomfort. They tend to look on the dark side of the picture, thus become the subject of numerous delusions. The term **traumatic neurasthenia** is applied to those cases having a preceding injury. Some cases of neurasthenia terminate in insanity. As a rule this condition responds readily to Chiropractic adjustments.

Chorea or St. Vitus' Dance

Definition.—Chorea is a disease of the nervous system characterized by irregular involuntary muscular movements accompanied by emotional disturbances.

Adjustment.—Adjustments found to have been valuable in the correction of chorea are those of the upper cervical, lower cervical, upper dorsal, and sometimes lower dorsal regions.

The disease predominates in children under fifteen years of age and is more common in girls than in boys. Its prevalence is greatest during the winter months and is frequently preceded by tonsillitis, measles, or scarlet fever. Endocarditis develops in a percentage of the cases which indicates that nasopharyngeal inflammation may have an etiological bearing in these cases. The fact that most cases promptly respond to cervical adjustments would seem to denote a motor neurosis.

Symptoms.—Chorea or St. Vitus' dance is also called **Sydenham's chorea.** The onset may be gradual with slight muscular twitching of one or more muscles. More commonly it begins with winking of the eyelids and twitching of the mouth. As the disease advances, the muscles of the neck, shoulder, and arm may become involved. The affection, as a rule, is progressive in character. Contractions become evident in almost all muscles of the face, neck, and extremities. Sometimes one side is attacked in advance of the other. The muscular movements are gross and purposeless; they are increased in intensity upon mental excitement or when the patient is conscious of being watched. Speech is indistinct and confused. The thoughts are flighty; concentration is poor; the intellect is dulled; and the temper is irritable. The muscles are easily fatigued and become exhausted. When the patient is quiet and alone, the muscular movements are less frequent and entirely subside during sleep.

The heart action is usually rapid and irregular. The appetite is poor and digestion is impaired, both contributing to

emaciation and weakness. Most cases develop obstinate constipation which is undoubtedly favored by lack of normal exercise. In most cases there is slight fever of 99 to 100 degrees. The loss of appetite, weakness, and constipation may in part be attributed to this temperature. In severe cases there may be delirium or mania; then the condition is spoken of as **maniacal chorea.**

An attack of acute chorea usually lasts five or six weeks, but there may be recurrent attacks. Occasional cases retain some of the motor disturbances throughout life; these disturbances are in the form of tics usually involving a muscle of the face or neck. Paralysis is not common in chorea, but occasionally a monoplegia develops, the condition then being designated as **paralytic chorea.** In due time the chorea disappears, but the monoplegia may be permanent.

Acute chorea differs from **Huntington's chorea** in that the latter has a history of heredity, develops late in adult life, is chronic in nature, and is frequently associated with dementia.

Habit Spasm or Tic

Definition.—A habit spasm is a frequently repeated involuntary muscular contraction that involves a single muscle or small group of muscles. Generally it involves muscles of the face or neck.

Adjustment.—The adjustment may be any cervical vertebra causing nerve irritation.

Symptoms.—A spasm is an involuntary muscle contraction which may be tonic or clonic. A reflex spasm is a contraction induced by a stimulus applied to a sensory nerve, an example being many cases of torticollis reflexly induced by pleurisy or pathology in the lung. The muscular twitching of tic douloureux is a spasm resulting from the painful state of the trifacial nerve. Some tics are thought to be due to pathology in the motor cortex of the brain which destroys the inhibitory influence of those cells over the lower motor neurons.

In habit spasm there are sudden and repeated contractions of muscles of the face, neck, or shoulders. The mouth may be drawn toward one side. There may be a nodding of the head or a shrugging of the shoulders. The apparently erroneous term habit spasm is applied to this motor neurosis caused by spinal nerve irritation or a cortical lesion.

Saltatory spasm involves the muscles in the calf of the leg. When these muscles are relaxed, there are no spasms; but when the patient attempts to walk, the calf muscles suddenly contract. This elevates the heel and transfers the weight forward to the toes. Hence, the contraction gives the patient a springing or jumping movement designated as saltatory spasm.

Spasmodic tic with coprolalia is an affection of the nervous system characterized by involuntary muscular movement, mental instability, and indecent or inarticulate utterances.

Symptoms.—This condition makes its appearance in irregular paroxysmal attacks. The muscles of the face, neck, or upper extremities may be involved exclusively. More often, muscles of the major portion of the body become affected. The attack is initiated by a sudden contraction of the affected muscles during which time the patient may jerk, jump, hiccup, bark, or imitate sneezing. These movements are accompanied or followed by inarticulate utterances or obscene or profane language. The utterances likes the muscular movements are rapid and jerky. The condition predominates in boys prior to puberty.

Nodding spasm affects the muscles of the neck and is characterized by a regular nodding movement of the head. The nodding spasm is also called spasmus nutans. It may occur in periodic attacks or the nodding may progressively develop and become perpetual during waking hours. The movements vary in rapidity being from thirty to sixty per minute. The nodding movement of the head may be from side to side or backward and forward.

Torticollis or Wryneck

Definition.—Torticollis or wryneck is a condition in which there is a tonic spasm of those muscles of the neck which rotate the head and flex the neck. This may affect the sternocleidomastoid muscles, the trapezii, or other cervical muscles individually or collectively.

Adjustment.—About 50% of torticollis is a motor reflex evoked by pathology in the lung or pleura. These cases respond to the proper dorsal adjustment. The remaining 50% of the cases are due to cervical subluxations varying from the atlas to the seventh cervical inclusively. The point of nerve pressure is readily detected by proper examination.

Symptoms.—Acute torticollis begins suddenly with severe pain in the neck when movement is attempted. In many cases the discomfort is progressive both in intensity and area involved. A tonic spasm of the muscles restricts the radius of movement. Any movement that induces pain intensifies the spasm. The head is usually drawn slightly forward and toward the affected side. The face is rotated toward the opposite side, and the chin is slightly elevated. The sternomastoid muscle on the affected side stands out prominently being both visible and palpable. Acute torticollis may be a myositis or purely a motor and sensory neurosis. Chronic torticollis presents structural changes described as fibrositis.

Paralysis Agitans

Definition.—Paralysis agitans is also called **Parkinson's disease** or **shaking palsy.** It is a chronic disease of the nervous system characterized by muscular weakness, tremor, and flexor rigidity.

Adjustment.—Upper cervical and upper dorsal nerves are most commonly involved in this disease.

Pathology.—There is no constant gross pathological lesion found in all cases of paralysis agitans. Structural derange-

ment has been found in the basal ganglia in the majority of the cases. The large cells in the corpus striatum are regarded as being motor in function, while the small cells are coordinating or inhibitory. Damage to the large cells causes spasticity and paralysis, while damage to the small cells produces tremor. Sclerotic changes of gradual onset and slow progress occurring after the fortieth year and accompanied by weakness, tremor, and flexor rigidity are looked upon as evidence of Parkington's disease.

Gross or minute pathological changes which occur in the basal ganglia following acute or infectious diseases are considered to be basilar encephalitis rather than paralysis agitans.

Symptoms.—Paralysis agitans rarely begins before the fortieth year and is more common after fifty. The typical case has an insidious onset and progresses slowly over a period of several years. Occasionally there are aching pains in the shoulder which may radiate through the arm to the fingers. In early stages there is a slight tremor of the thumb which is not constant. As the disease progresses, the tremor is easily detected and involves the thumb and fingers. Alternating spasm of flexors and extensors produce the "bread-crumbling" or "pill-rolling" movement. The tremor increases and in due time involves the forearm as well as the hand before developing on the opposite side. In advanced cases all four extremities may be affected by the tremor in addition to the lips or chin. A flexor rigidity develops in the early stages and progresses throughout the disease. This flexor rigidity, which involves all flexor muscles of the trunk and extremities, causes a characteristic posture and position of the extremities when the patient is seated, standing, or walking. The distinctive gait of paralysis agitans is the festination or propulsive gait. It is difficult for the patient to arise, sit down, begin walking, stop quickly, or change the direction in which he is walking. All this is due to the muscular rigidity and diminished voluntary control over muscular movements.

Most cases have excessive saliva secretion with drooling. The voice may become high pitched, and the patient usually talks in a monotone. The tremor diminishes or subsides during voluntary movement; this enables the patient to button his clothing, sign his name, or play a fair game of billiards. The tremor ceases during sleep.

The typical facial expression is called Parkinson's mask. It is due to the general rigidity of the facial muscles. The eyeballs appear large and semifixed, but there is no exophthalmos. The facial expression prevents showing emotions, such as pleasure, fear, or anger.

In advanced cases the muscular rigidity is quite general and may affect speech, swallowing, breathing, and walking. The reflexes are often slightly altered but not lost. The patient's life is not shortened by paralysis agitans except as it produces invalidism which creates susceptibility to current diseases. Intelligence is not impaired. Those patients who become emotional, irritable, or depressed usually have senile changes, such as arteriosclerosis.

Basilar encephalitis is more common between the ages of eighteen and thirty. Its progress is quite rapid, often reaching maturity in from one to two years. After maturity the condition may remain stationary for years. A tremor is present, but it is not the characteristic bread-crumbling movement. The facial expression may be altered, but it is not masklike as in Parkinson's disease. Weakness is slight or absent, whereas it progressively increases in Parkinson's disease.

The Occupation Neuroses

Definition.—The occupation neuroses are a nervous affection of the muscles of the thumb, fingers, or forearm characterized by spasmodic contraction upon sustained use.

Adjustment.—Local adjustments in the lower cervical or upper dorsal region improve innervation of the involved muscles.

Symptoms.—The term occupation neurosis is applied to a variety of nervous disturbances affecting the use of the hands or arms. Common examples are writers' cramp, telegraphers' paralysis, violinists' paralysis, and pianists' paralysis.

The affected muscles may be used in the customary manner for a period of time. However, prolonged use may cause a tonic spasm of the involved muscles. In **writers' cramp** the flexor muscles of the thumb and fingers used in writing are involved by the spasm. In **telegraphers' cramp** the extensor muscles of the first and second fingers are usually involved in the spasm. In **violinists' cramp** the flexor muscles of the fingers are affected by pain and rigidity. Likewise, in **pianists' cramp** pain and rigidity affect muscles in the forearm.

The condition develops as the result of long and continuous use of these muscles which causes them to become fatigued. Improved innervation permits normal use, but prolonged fatiguing exercise should be avoided.

Tetany

Definition.—Tetany is a neuromuscular disease characterized by intermittent tonic spasms of the extremities. The disease is classified as belonging to those of the nervous system and also to those of the ductless glands. The latter classification is based upon the fact that calcium metabolism is diminished because of parathyroid insufficiency. The disease is most common among children. In adult life it most commonly follows surgery in which parathyroid circulation has been disturbed.

Adjustment.—Cervical and upper dorsal adjustments are of particular importance in tetany.

Symptoms.—The tetany contractions occur in attacks involving the upper and lower extremities. First, the flexor muscles become contracted, causing the arms to be folded and the wrists flexed. The thumb is usually folded in the palm of the hand; but the fingers may be extended; and there may

be athetoid movements. The foot is extended; the heel is drawn up; and the toes are adducted. The attack may be transitory with frequent recurrences, or it may be continuous for hours or days. The muscles of the face, eyes, and tongue may be affected; and in rare instances respiration is impaired. Consciousness is retained except in the most severe cases. At first the contractions are painless but after a time become painful similar to those of cramps. When tetany exists for a long time early in life, it impairs development of the teeth, ossification, and healing of fractured bones. The lens of the eye may become opaque, producing a lenticular cataract. Most cases respond to proper adjustments and proper food supplying deficient elements. The prime object of the adjustment is to restore parathyroid function, and the diet should include adequate calcium and vitamin D.

Raynaud's Disease

Definition.—Raynaud's disease is an affection of the vasomotor division of the nervous system characterized by coldness, numbness, and pallor or cyanosis of the fingers and toes.

Adjustment.—Adjustment should be made in the local zone in conjunction with the lower dorsal region as indicated by examination.

Pathology.—There is no permanent structural change in the artery walls in Raynaud's disease. Pallor and coldness are due to vasospasm of the arterioles. When the arteriolar spasm relaxes, the skin becomes warm and red due to a reactive hyperemia. This hyperemia soon subsides, and the part remains normal until the next vasospasm.

Symptoms.—Raynaud's disease may affect either the upper or lower extremities or all of them. As a rule two or more digits are involved and become pale, cold, and numb followed in time by cyanosis. This may be momentarily relieved by the application of heat. Recurrences are frequent. In due time

additional sensory symptoms of tingling and throbbing develop. The skin is glossy and appears tightly stretched in spite of the fact that the fingers have become thin and tapered. The fingernails grow slowly and become deformed. Finally gangrene develops around the border of the fingernail, but it is rare that the digit is amputated by the gangrenous process. The condition is most common in young women, but the life expectancy is not shortened by it.

Dr. George H. Patchen (M. D., D. C.) described two cases which fully recovered in 1911. He was expelled from the medical associations because of recommending Chiropractic adjustments for these cases.

Progressive Facial Hemiatrophy

Definition.—Progressive facial hemiatrophy is an affection of the vegetative nervous system supplying the face and characterized by atrophy of the bones and soft itssues of one side of the face.

Adjustment.—The adjustment may be cervical or upper dorsal. In the cervical region the ganglia or gray rami may be impinged, while in the upper dorsal region the white rami may be affected.

Symptoms.—The disease begins slowly with dryness and scaliness of the skin on one side of the face because of an increasing loss of function of the sebaceous glands. There may be patches of leukoderma or alopecia. Shrinkage of the subcutaneous tissue causes the skin to wrinkle. Bones and cartilage are no more resistant to the atrophy than the soft tissues. Even though the eyeball on the affected side becomes sunken, the eyelids have so narrowed as sometimes to be insufficient to cover the eyeball. Trifacial neuralgia is a nonessential feature sometimes associated with this disease. Usually a sharp line of demarcation passes through the middle of the forehead, nose, lips, and chin between the affected and the unaffected sides of the face.

This process may extend to the shoulder, extremities, or trunk causing lack of symmetrical development. When affecting the trunk, it causes spinal curvatures. Involvement of one arm or hand causes the extremity to be both small and short as compared with the normal one. The condition may be progressive for a time, then become stationary; but all changes are permanent. There is no impairment of the mentality.

Bell's Palsy

Definition.—Bell's palsy is an acute paralysis of one side of the face due to inflammation of the seventh cranial nerve. It is also called **facial paralysis** and **facial hemiplegia.**

Etiology.—The facial nerve emerges from the skull through the stylomastoid foramen. In an acute inflammation the nerve trunk swells; hence it may be constricted at the foramen. In this condition the nerve may be unable to convey impulses to the facial muscles. The pathology in this type is a neuritis; although in some cases of Bell's palsy a hemorrhage into the substance of the nerve or its nucleus in the medulla constitutes the cause.

Adjustment.—The adjustment is upper cervical. Often the interference is caused by disrelationship of the condyles upon the atlas.

Symptoms.—Generally exposure to a draft or cold air striking the side of the face is sufficient cause of acute cases. Occasionally it follows septic infection of the throat, ear, or sinuses. The onset is sudden with a tingling sensation in the lips or cheek. The patient discovers that he is unable to close the eye upon the affected side and that the mouth is drawn away from the paralyzed side. It is impossible to whistle, pucker the lips, or place them in position to pronounce the letter "O."

Mastication is impaired for the patient has poor control over food and has difficulty placing it between the teeth. There is a tendency for saliva to drool from the corners of the mouth.

There is no pain in Bell's palsy except when the chorda tympani is involved, in which case pain may be confined largely to the tongue.

In the acute stages results are splendid, most cases recovering in from two to four weeks. After a duration of one year a guarded prognosis should be made, as the nerve structure may have undergone marked degeneration.

Neuralgia-Neuritis

Neuralgia literally means nerve pain. It is a painful condition of a nerve in which there is either a functional disturbance or a neuritis. In other words, the word neuralgia has a dual use: it is frequently employed as a symptom meaning nerve pain; it is also used as a diagnosis implying the ailment causing the pain possesses distinctive features differentiating it from neuritis.

Neuritis is an inflammation of a nerve and causes destruction of the nerve fibers. Pain is present in the early stages of neuritis. The pain is continuous and may be severe at the onset, but in time it is replaced by anesthesia; this is due to the progressive morbid changes in the nerve. Neuritis of motor nerves causes flaccid paralysis, atrophy of muscles, and loss of reflexes, while neuritis of sensory nerves causes pain at first and finally anesthesia.

A true neuralgia does not destroy the affected nerve even though of long duration. Pain in neuralgia is always intermittent. It is sharp and lancinating. It radiates along the course of the nerve. Neuralgia does not cause paralysis, atrophy, nor loss of reflexes. Pain may be the sole symptom, but occasionally there are motor and secretory disturbances.

Coccygodynia

Definition.—Coccygodynia is a neuralgia affecting the lower sacral or coccygeal nerves.

Adjustment.—This is usually caused by an anterior subluxation of the coccyx. Occasionally it may be caused by lumbosacral or sacro-iliac disrelationship.

Symptoms.—Coccygodynia begins suddenly with sharp radiating pains in the region of the sacrum and coccyx. Pain is intermittent but may be induced at any moment by movements which place strain upon the adjacent muscles. Walking and flexing the trunk upon the thighs increase the pain. There is tenderness upon palpation which if traced leads to the point of nerve pressure.

Sciatica

Definition.—Sciatica usually is a neuralgia of the sciatic nerve. However, it may be a neuritis of the nerve and is then characterized by motor, trophic, and sensory disturbances. The sciatic nerve arises from the two lower lumbar nerves and the first three sacral nerves; when one of these nerve roots is affected, the condition may be called **radiculitis.**

Adjustment.—The adjustments found most useful in relieving sciatica are those of the fourth and fifth lumbar, sacrum, or ilium.

Pathology.—Since sciatica literally means a condition of the sciatic nerve, there may or may not be pathology. Slight pressure of the lower spinal nerve roots may cause irritation without the development of inflammatory changes. When neuritis exists, usually there are toxic causes. The nerve is then hyperemic and edematous; the surrounding sheath is stretched. Microscopic inflammatory changes develop in the nerve fiber, and ultimately there will be destruction with fibrosis.

Occasionally one or more of the nerve roots may be impinged by the protrusion of the nucleus pulposus from a lower

lumbar disk. This herniation is permitted by a weakness or rupturing of the annulus fibrosus at the posterior part of the disk. A severe compression of the disk, especially when repeated or prolonged, forces the nucleus pulposus backwards upon the posterior longitudinal ligament. The protruding mass may either penetrate the ligament or cause a bulge of the ligament into the spinal canal, the latter occurring more often. In either case the spinal nerve roots at the site of the protuberance may be stretched to the point of dysfunction. The fifth lumbar disk and the first sacral nerve are the structures most commonly involved in this condition. A zone of analgesia corresponding to the distribution of the impinged nerve may be found. The herniated condition is usually found in men whose spines show some bony malformation. Those herniations of the nucleus pulposus that do not penetrate the posterior longitudinal ligament are readily reducible by proper adjustive technics.

Symptoms.—Sciatica begins suddenly with pain in the back or at the sciatic notch. The pain may radiate from the toes to the spine or be confined to a limited area, as the leg, thigh, or hip. Attempted nerve tracing indicates that there is marked tenderness along the course of the nerve. The pain is subject to marked variation; at times it is dull and aching, at other times severe and lancinating. Cold aggravates the pain, yet warmth does not always relieve it. The pain is greatly intensified at the sciatic notch by flexing the thigh when the leg is extended. The lumbar muscles are contracted, causing the pelvis to become tilted. An adaptive scoliosis with some rotation is always found in the lumbar region. Because of vasomotor involvement the skin of the affected extremity is usually cold and sometimes mottled. The degree of distortion varies greatly. Some cases sit or stand relatively erect, while in others the pelvis is deflected laterally to a marked degree. The condition is rarely bilateral, but occasional cases may have attacks, alternating first on one side of the body and then the other.

Plantar Neuralgia

Definition.—The term plantar neuralgia is applied to those cases in which the plantar branches of the sciatic nerve are affected.

Adjustment.—The adjustment is the same as for sciatica.

Symptoms.—Plantar neuralgia is characterized by intermittent attacks of pain in the toes and the sole of the foot, the pain radiating from the toes toward the heel. The position of the foot or leg does not influence the pain. Walking is usually impaired. The plantar neuralgia may be preceded or followed by sciatica of which it is a part.

Erythromelalgia is sometimes called red neuralgia of the hands and feet. It differs from plantar neuralgia in that the skin is red due to hyperemia of the cutaneous vessels. The pain is continuous and of a burning character. The discomfort is intensified by standing, walking, or sitting with the feet upon the floor. All symptoms are relieved by elevating the affected foot above the level of the hips. This position aids drainage and lessens the engorgement of blood vessels.

Tarsalgia is pain of the foot due to stretching of the plantar ligaments. It is commonly found in those who are overweight, stand excessively, or have edema of the lower extremities which weaken and stretch the tissues. The pain in tarsalgia is promptly relieved by removing the weight from the feet. The position of the lower extremity does not influence the pain as in erythromelalgia, nor is the pain intermittent and radiating as in plantar neuralgia.

Lumbo-Abdominal Neuralgia

Definition.—Lumbo-abdominal neuralgia is a neuralgia of the lower intercostal or upper lumbar nerves.

Adjustment.—Lower dorsal or upper lumbar adjustments generally relieve this condition.

Symptoms.—As in other neuralgias the pain is intermittent, sharp, and radiating. It may involve the loins and buttocks as well as the abdominal wall. Lumbo-abdominal neuralgia resulting from spinal nerve root pressure is often mistaken for abdominal disease having pain, such as appendicitis. This is particularly true when the nerves supplying the hypogastric and inguinal regions are affected. From the inguinal region the pain may radiate into the thigh and is called meralgia. Flexion of the thigh is not uncommon in these cases.

Cervico-Occipital Neuralgia

Definition.—Cervico-occipital neuralgia affects any of the upper cervical nerves, particularly the suboccipital nerves.

Adjustment.—The condition is usually relieved by proper adjusting of the condyles, atlas, or axis.

Symptoms.—The pain is usually unilateral and confined to the top and back of the head. Ordinarily the face is not involved since it receives its sensory supply through the fifth cranial nerve; however, it may be associated should the spinal pressure implicate the trifacial. Upper cervical subluxations cannot directly impinge the fifth cranial nerve but can disturb its function through reflexes.

Intercostal Neuralgia

Definition.—Intercostal neuralgia is a neuralgia involving the intercostal nerves.

Adjustment.—Adjustments should be made locally according to findings in the zone of the pain. The middorsal nerves are most commonly affected.

Symptoms.—The attack of pain is sudden although there may be aching and tenderness along the spine prior to the onset of pain. The pain is sharp and intermittent, radiating from

the anterior midline of the body to the spine. It may be unilateral or bilateral. The pain is not influenced by breathing nor by ordinary movements of the body; these distinguish the neuralgia from pleurisy and pleurodynia. Occasionally intercostal neuralgia terminates in neuritis with the development of a herpetiform eruption, occurring in clusters along the affected nerve or nerves. The condition is then known as herpes zoster or shingles. When adjustments are administered before the eruption, the pain is relieved promptly. When intercostal neuritis is present, recovery occurs more slowly. Mild cases are promptly relieved, but severe cases may require weeks of patient treatments.

Trifacial Neuralgia

Definition.—Trifacial neuralgia is a neuralgia affecting the sensory divisions of the trifacial nerves.

Adjustment.—Upper cervical adjustments have proven to be effective in relieving trifacial neuralgia. Apical abscesses of teeth, sinusitis of the antrum of Highmore, or necrosis of the jawbone are common causative factors and must be properly eliminated.

Symptoms.—Pain of trifacial neuralgia may affect the ophthalmic, maxillary, or mandibular divisions. The pain occurs in intermittent attacks. As in other neuralgias, the pain is most intense and radiates along the nerve course. It may be associated with muscular twitching or spasm and is then known as **tic douloureux.** At times there may be no pain for hours or days. An attack of pain may be initiated by yawning, exposure to a cold draft, or blowing the nose. The conjunctiva on the affected side may be congested and discharge a watery secretion. Mastication of food and speech are more or less voluntarily suppressed since they frequently induce attacks of pain. In many cases pain is the lone symptom.

Neuritis

Neuritis is a nerve inflammation. It may affect a single nerve, group of nerves, or many nerves. When involving a single nerve, it may be termed **mononeuritis** and is usually specifically named according to the nerve affected; examples are axillary, ulnar, median, seventh intercostal, femoral, or sciatic. When two or more nerves supplying the arm or shoulder are affected, the condition is commonly termed **brachial neuritis.** Similarly, the terms **lumbar neuritis** and **sacral neuritis** may be employed. When a large number of nerves of wide distribution become inflamed, the condition is named **multiple neuritis** or **polyneuritis.**

Adjustment.—Localized neuritis may be caused by trauma, toxic irritation, or pressure. The most vital adjustment in local neuritis is in the zone of the affected nerve. In brachial neuritis corrective adjustments are required in the lower cervical or upper dorsal spine. In intercostal neuritis adjustments should be made in the zone of the inflamed intercostal nerve. In neuritis of the lumbar plexus adjustments are indicated in the upper and middle lumbar region. In neuritis of the sacral plexus adjustments are indicated in the lower lumbar or sacro-iliac region of the spine.

Pathology.—Inflammation may begin in the nerve sheath or gradually invade the interstitial tissue and still later the parenchyma. The nerve is edematous from infiltrated serum and cells and deep red in color due to engorgement of its vessels. In due time the axis-cylinders undergo granular degeneration and become liquefied. The nerve diminishes in size and is replaced by fibrous connective tissue.

Symptoms.—The symptoms of neuritis consist largely of sensory and motor disturbances. The sensory disturbances consist of pain, tenderness, and paresthesias. The pain may be mild, moderate, or severe. It is intensified by pressure and the application of cold. The pain diminishes as the disease pro-

gresses whether that be rapidly or slowly. In many cases paresthesias are more pronounced than pain. These consist of numbness, burning sensation, tingling, coldness, formication, and a feeling of weakness.

The motor disturbances consist of paralysis. The muscles supplied by the affected nerves become flaccid and atonic; these undergo some degree of atrophy, show the reaction of degeneration, and lose the ability to respond to stimuli. Localized neuritis as a rule does not have fever except when of toxic origin and when several nerves become inflamed.

Localized neuritis differs from neuralgia in that there is paralysis and atrophy preceded by paresthesias or pain. Neuralgias have pain and often paresthesias but neither paralysis nor atrophy.

Multiple Neuritis

Definition.—Multiple neuritis is also known as **peripheral neuritis** and **polyneuritis** and is an inflammation of many nerves.

Adjustment.—The adjustment should include middle and lower dorsal regions for the purpose of increasing the excretory function of the liver and kidneys. In addition, local adjustments should be made for the correction of subluxations in the zones involved.

Pathology.—For changes in the nerve structures see the preceding topic.

Multiple neuritis is a relatively rare disease. It is commonly the result of toxic conditions arising from inorganic or organic substances. Polyneuritis may be encountered in cases of chronic alcoholism, copper and lead poisoning, carbon monoxide poisoning, and excessive use of coal tar products. Occasionally it is encountered in diabetes, syphilis, and tuberculosis. The paralysis of beriberi is recognized as being caused by polyneuritis.

Symptoms.—There may be prodromes of weakness, numbness, or pain for several days. These prodromes are followed by fever varying from 100 to 103 degrees. Both upper and lower extremities are involved and decidedly tender. For several days or weeks the tenderness, pain, and weakness steadily increase. The inability to walk and use the arms is due to the muscular paralysis. Involvement of the anterior tibial nerve causes foot drop and a steppage gait similar to that found in flaccid paralysis of the lower extremities. In the upper extremities the radial nerve is involved and gives rise to the wrist drop. As sensory nerves are destroyed by the inflammatory process, the pain and paresthesias give way to anesthesia. The reaction of degeneration may appear as early as the second week. The reflexes which at first were diminished are soon lost.

Occasionally nerve cells in the spinal cord and brain are involved, causing their respective symptoms. The cranial nerves do not always escape injury; the optic nerve is the most commonly affected.

A multiple neuritis most commonly develops in adults after the thirtieth year. It does not occur in epidemics. The paralysis is preceded by sensory disturbances, and there is no self-improvement in the condition. Poliomyelitis is more common in epidemics but usually affects children. The paralysis is of sudden onset, and there is self-improvement in those parts least damaged.

Pseudohypertrophic Muscular Paralysis

Definition.—Pseudohypertrophic muscular paralysis is a condition in which there is a decrease in the power of muscles but an increase in their size. It is a form of muscular dystrophy which develops before puberty.

Adjustment.—Upper cervical and lower dorsal regions should be corrected.

Pathology.—The muscles of the buttocks and calf undergo

fatty and fibroid changes. They become large in size and extremely firm but have diminished contractile power.

Symptoms.—The first symptom to attract attention is the waddling gait. There is muscular weakness and a marked tendency to stumble. Muscles of the calf and of the gluteal region become hypertrophied and firm, while the spinal and scapular muscles undergo atrophy. A persistent lumbar lordosis develops to compensate for the weakness of the spinal muscles. In walking the head and shoulders are thrown to one side, the pelvis tilting markedly in the same direction, in order to enable the leg and foot on the opposite side, as the weight is removed, to be freely pushed forward. The child cannot arise from the floor without the use of his arms and hands. There may be periods of short improvement early in the disease between the fifth and tenth year of life; thereafter the disease progresses slowly until invalidism by the fourteenth year. This disease in itself is not fatal, but its subjects are susceptible to infectious disease, especially pneumonia.

Progressive Muscular Atrophy

Definition.—Progressive muscular atrophy is also a muscular dystrophy characterized by extreme atrophy of the skeletal muscles.

Adjustment.—Upper cervical and lower dorsal areas should be adjusted.

Pathology.—There are several types of progressive muscular atrophy, some of which have no established pathology in the nervous system. The spinal type of progressive atrophy has an incomplete sclerosis of the anterior horn cells and anterior nerve roots. The nerve elements are replaced by a hyperplasia of fibrous connective tissue.

Symptoms.—The spinal and hand type of progressive muscular atrophy most commonly begins between the seventeenth and twenty-second year of life. It affects men more frequently

than women. The first noticeable symptom is atrophy of the muscles of the hand. This is accompanied by flexion of the thumb toward the palm, causing the so-called "ape hand." Next, the interossei and palmar muscles atrophy, causing the "claw hand." The atrophy spreads to the forearm and arm. The condition is bilateral, but changes may be observed on one side in advance of the other. There may be some pains and paresthesias, but sensation is not lost. The muscles of the shoulder and spine are next to be affected and lastly the muscles of the thighs and legs. The muscles of the face, neck, and eyeball are exempt. The waddling gait is present. The paralysis corresponds to the degree of muscular atrophy. Muscular twitching is common and is not confined to the affected muscles. Occasionally the disease becomes arrested after one or two years' duration. More often the course is progressive and leads to invalidism.

Progressive muscular atrophy may develop in middle life. It progressively involves muscles of the extremity, shoulder, and spine. Neuralgic pains are more common. The facial muscles may be affected, causing a peculiar facial expression called the "myopathic facies."

A rather unusual form of progressive muscular dystrophy is known as **Erb's type** or the juvenile form. It attacks the muscles of the arm, shoulder, back, and thighs, all of which undergo marked atrophy; but the muscles of the forearm and leg remain normal. It usually begins before puberty, does not affect the face and neck, forearm, or leg but does have the characteristic waddling gait. No pathology has been established to explain this unusual manifestation.

THE SPINAL CORD

The spinal cord is an important part of the central nervous system. It is looked upon as a nerve center. This is because its medullary portion is composed of nerve cells constituting the gray matter. It is also an organ of conduction by reason

of the fact that its cortex is composed of fibers which conduct impulses centralward to the brain and peripheralward to the cells in the anterior columns or horns.

The spinal cord must be in a healthy condition itself in order to perform its normal function. To be healthy it must be properly nourished, kept at a normal temperature, and must be normally sensitive; also its vessels must maintain the proper degree of tone. The recurrent meningeal nerves, one branching from each of the spinal nerves, re-enters the spinal canal through the intervertebral foramen. These nerves supply the meninges in particular but are also thought to exercise control over the vegetative functions of the spinal cord. Pressure upon a recurrent meningeal nerve will interfere with the functions of the cord and may impair the structure of that segment of the cord supplied by it. Therefore, ischemia or hyperemia of the cord may be caused by vasomotor impingement; atrophy and degenerative changes may result from pressure upon the trophic fibers; while sensory disturbances would result from pressure upon sensory fibers. The nature of spinal cord diseases depends upon the function of the tract or nerve pathway whose function has been altered by nerve impingement. Different disease entities result from an involvement of different nerve centers or one or more of the various tracts.

The anterior columns or horns of the spinal cord are composed of motor cells whose axons enter the anterior nerve root to form the spinal nerve. The lateral columns or horns of the spinal cord are composed of vasomotor, secretory, and trophic cells whose axons form the white rami which belong to the vegetative nervous system. Degeneration of the anterior column at a given level will disturb those functions governed by the cells in that portion of the anterior column. In infantile paralysis it is common to observe loss of motor power, atrophy, cyanosis, and dryness of the skin. These four symptoms would indicate involvement of the respective four functional centers situated in the anterior and lateral columns. A loss of motor

power only would indicate involvement of the motor cells; but the vasomotor, trophic, and secretory cells would be undamaged. Diseases situated in the anterior column of the spinal cord may involve one, all, or any combination of these four functions. When the motor cells are destroyed, the resulting paralysis is flaccid; and the deep reflexes are absent.

The posterior nerve root ganglia are composed of sensory cells whose modified dendrites carry sensory impulses from both the somatic and the vegetative structures. The axons of these sensory cells enter the spinal cord through the posterior nerve root. Sensory impulses are conveyed centralward through different tracts. The muscular sense fibers ascend through the fasciculus gracilis and cuneate fasciculus. Tactile impulses ascend through the ventral spinothalamic fasciculus, while temperature and pain impulses ascend through the lateral spinothalamic fasciculus. The fibers which convey tactile, temperature, and pain impulses cross and ascend on the opposite side of the cord, while fibers conveying the muscular or knee-joint sense ascend on the side of their origin. Diseases which destroy the posterior columns, funiculi, and nerve roots produce sensory symptoms only since motor, trophic, and secretory fibers are not in the posterior part of the cord.

The muscular sense is used in judging weight, direction of movement, position, and pressure. It is through this sense that equilibrium is maintained. Loss of this sense causes ataxia and accounts for the positive Romberg's sign in locomotor ataxia. Diseases which destroy the cells in the posterior nerve root ganglia or fibers of the posterior nerve root cause loss of reflexes because of interrupting the reflex arc.

The crossed pyramidal tracts are the chief motor tracts from the brain. The nerve fibers leaving these tracts terminate in the anterior columns. Through them the motor cortex exercises an inhibitory and controlling influence over the anterior horn cells which are activators. Disease processes which damage the pyramidal tracts produce spastic paralysis. Reflexes are exaggerated due to the absence of inhibitory im-

pulses reaching the anterior cells. The absence of atrophy, coldness, and dryness of the skin in affections of the pyramidal tracts is because only motor fibers constitute these tracts.

The extent of a permanent paralysis due to disease of the spinal cord depends upon the area of the cord permanently damaged. It usually does not depend upon the area of the cord involved by the disease process. An acute inflammation may be centralized in a limited portion of the cord, but the hyperemia and edema in the acute stage may involve portions quite remote from the center of inflammation. When the inflammation subsides, the hyperemia and edema diminish. The intermural pressure diminishes in the remote parts, and function is gradually re-established. The part in which the inflammation was centralized may be irreparably damaged with a resulting permanent paralysis.

Acute Ascending Paralysis

Definition.—Acute ascending paralysis is also known as **Landry's paralysis.** It is an ascending flaccid paralysis beginning in the lower extremities and rapidly extending upward involving the trunk, arms, and finally the muscles of respiration.

Adjustment.—The upper cervical spine should be corrected in all cases. The zone in which the paralysis begins should never be overlooked.

Pathology.—Landry's paralysis appears to be related to infantile paralysis. It is probably a sporadic type of the disease which begins in the lower dorsal cord. The anterior columns or horns are congested and infiltrated with serum and cells. As a rule it does not affect the sympathetic cells in the lateral column or horn of the cord and, therefore, does not involve visceral structures.

Symptoms.—Weakness in the feet and legs is the first symptoms to attract the attention of the patient. There is general

malaise and often slight fever. The condition is bilateral and spreads rapidly from the feet to the waist line. The paralysis is flaccid, and reflexes are lost early in the disease. Involvement of the spinal muscles follows those of the lower extremities. The facial expression may be altered; swallowing and mastication may become difficult or impossible. The respiratory muscles are the last to be attacked and when involved there is dyspnea and cyanosis. As a rule, the sensory function is not affected because the pathology is localized in the anterior horns. The duration of acute cases varies from one to four weeks.

There are cases which follow a subacute or a chronic course. In a few days progress of the disease appears to be arrested. Occasionally there is recovery, or the condition may remain stationary for months or years.

Acute Anterior Poliomyelitis

Definition.—Acute anterior poliomyelitis is an acute inflammation of the anterior columns or horns of the spinal cord characterized by fever, flaccid paralysis, and atrophy. It is more commonly called **infantile paralysis** and is also known by **infantile spinal palsy.** The disease predominates in children, a majority of whom are under four years of age. The incidence of infantile paralysis among older children and adults appears to be on the increase.

Adjustment.—The spinal cause of infantile paralysis is diminished innervation due to impingement of the recurrent meningeal nerve. This may be at any point in the spine. In some cases the atlas or axis is the site of the primary impingement. In other cases lower cervical, upper dorsal, lower dorsal, or upper lumbar adjustments are most effective.

Pathology.—Hyperemia with accompanying edema first develops in the anterior nerve root, involving the meninges. The process spreads to the anterior column or horn, involving a portion or all of one or both of the anterior columns. These

changes most commonly occur in the cervical or in the dorso-lumbar enlargement. In the early stages the paralysis results from the inflammatory process, particularly the edema. In time degenerative changes develop in the nerve cells which may be replaced by connective tissue. Occasionally inflammatory changes extend beyond the boundaries of the anterior columns, causing sensory disturbances and consequently an atypical case of the disease.

In the bulbar type of poliomyelitis inflammatory changes occur in the medulla and disturb the function of the cranial nerves.

Symptoms.—Acute poliomyelitis begins suddenly with malaise, headache, head cold, or digestive disturbances. There is a slight fever which lasts from two to five days and rarely exceeds 102 degrees. The typical symptoms of fever are present; but in a large number of cases the digestive disturbances of nausea, vomiting, and diarrhea are outstanding. Occasionally there is sore throat, causing enlargement of the cervical lymphatics. The neck may be somewhat stiff, and the child complains of pain when the head is flexed forward. A flaccid paralysis suddenly develops, usually during the night, between the second and fifth day. The fever may have subsided prior to the development of the paralysis, or it may linger for a day or two after the onset of the paralysis. Paralysis may be confined to one or two extremities or may involve all four extremities, depending upon what portions of the spinal cord are inflamed. As a rule, the bladder and rectum are not affected. There is variable spinal pain which radiates into those extremities attacked by the paralysis. This symptom arises because of meningeal or sensory involvement. There is no anesthesia, or if present it is but temporary.

The paralysis is flaccid because the pathology involves lower motor neurones. This flaccidity is more noticeable in the muscles of the calf than in those of the thigh. Flaccidity of the anterior tibial muscles causes foot drop which is responsible

for the steppage gait when walking becomes possible. In most cases the vasomotor cells of the lateral column are affected, causing the skin to be mottled and cold. Damage to the trophic cells causes atrophy and inhibits normal growth in the extremity.

During the subacute stage invariably there is partial recovery. This is most evident in the extremities least affected. While in the acute stages usually the legs are unequally paralyzed, but the paralysis subsides in the one least affected, the other remaining partially or totally paralyzed. In general it may be said that recovery from the paralysis may be complete or partial, but when partial it is rarely symmetrical. The paralyzed extremities fail to grow as the others do and become deformed as the result of contractures which are evident within the first year. The most common deformity involves the foot: any form of talipes may develop.

Unequal development of the legs as a result of poliomyelitis causes a tilting of the pelvis, and a compensatory spinal curvature results. This lateral bending of the spine may occur without fixation in the early stages. At that time it may be evident when standing, absent when sitting or lying in the prone position. When fixation occurs, the curvature will be discernible in any and all positions.

When the inflammatory process involves the medulla or intracranial structures, it is known as the **bulbar type** or **bulbo-spinal type** of poliomyelitis. In this type the facial muscles may be affected from damage to the nuclei of the seventh cranial nerves. There may be strabismus from impairment of the third, fourth, or sixth cranial nerves. There are disturbances of speech and swallowing due to implication of the glossopharyngeal nerve. Not infrequently respiration becomes impaired from involvement of the respiratory center. Paralysis of the diaphragm and the intercostal muscles also proves fatal in the majority of instances; however, paralysis of these muscles of respiration results from damage to the spinal cord.

The average case of infantile paralysis improves sufficiently during the course of a few months to permit an attempt at walking. The steppage gait is present whether one or both legs are affected.

Chiropractic adjustments give most benefit when the case is acquired for treatment in the early stages of the disease; hence, the results are not governed by the extent of the pathology as much as by the stage of the condition. A case of total paralysis of the somatic structures, including inability to talk, masticate, or swallow, in which adjustments were started within three days recovered completely in twenty-five days. On the other hand, many practitioners have noticed only minor improvements after adjusting chronic cases of five or ten years' duration.

Infantile paralysis differs from transverse myelitis in that in the former the sensory function is not involved; there are no bed sores, no vesical or rectal anesthesia, no girdle sensation; and the paralysis is flaccid rather than spastic. Poliomyelitis differs from peripheral neuritis in its onset, for in neuritis the pain which is bilateral and in all extremities precedes all other symptoms; also the paralysis develops more gradually with little or no fever. The pain persists after the onset of the paralysis, and the reaction of degeneration appears early in neuritis, somewhat later in infantile paralysis.

Glossolabiolaryngeal Paralysis

Definition.—Glossolabiolaryngeal paralysis is a progressive paralysis of the tongue, lips, and pharyngeal and laryngeal muscles which occasionally extends to the muscles of the eyelids, face, and neck. This is also known as bulbar paralysis because of the location of the pathology.

Adjustment.—The anatomical changes for this progressive paralysis are degenerative in character and are situated in the motor nuclei of the cranial nerves supplying the tongue, lips, pharynx, and larynx. It affects the seventh, ninth,

eleventh, and twelfth cranial nerves in particular and may involve a few cells in the motor division of the fifth and tenth cranial nerves. As the nerve cells deteriorate, the muscles they supply undergo atrophy.

Symptoms.—Sudden paralysis affecting the facial and throat muscles do not belong to this disease. They are more apt to be a result of intracranial hemorrhage or peripheral neuritis.

The onset is gradual with difficulty in articulation. The sounds of "l," "t," and "d" are first impaired. The difficulty in articulation steadily increases and is later accompanied by difficulty in mastication and deglutition. Paralysis of the tongue prevents proper backward movement of the masticated bolus. As the lips become paralyzed, speech is more indistinct. The sounds of "m," "p," "b," and "o" are not clearly articulated. The mouth may remain open, and there is drooling of saliva.

When the soft palate becomes involved, food may enter the nasopharynx during the act of swallowing. The hard sounds of "g," "c," and "k" are difficult or impossible to enunciate. The lower part of the face does not change with the emotions. When the facial nerve becomes involved, the palpebral aperture cannot be closed. As a consequence, the conjunctiva is subject to irritation and becomes deeply congested. Aspiration pneumonia is commonly a complication due to the passage of food into the lungs.

Extension of the pathology into the motor cells of the spinal cord will produce paralysis of the muscles of the neck and arms. The affected muscles undergo atrophy.

Progressive Ophthalmoplegia

Definition.—Progressive ophthalmoplegia is a progressive paralysis of the muscles of the eyeball supplied by the third cranial nerve.

Adjustment.—Correction of the cervical spine is important in this condition.

Pathology.—The nucleus of the third nerve may be damaged by inflammatory or degenerative changes; therefore, progressive ophthalmoplegia may be associated with encephalitis. When of degenerative origin it may appear in a patient who is otherwise in excellent health.

Symptoms.—There is, at first, a limitation in mobility of the eyeball in observing moving objects. This is followed by a slight divergent strabismus which progressively increases. There are diplopia and gradually drooping of the upper eyelids. The peculiar expression produced by ptosis combined with divergent strabismus is called **Hutchinson's face.** Monocular vision is not impaired excepting as the upper lid may obstruct the entrance of light through the pupil. This condition may develop in rare cases of severe migraine and is somewhat more common in tumor of the brain, encephalitis, and meningitis.

The fourth or sixth cranial nerves are sometimes affected. Involvement of the fourth nerve causes the eyeball to deviate vertically; hence its visual axis is out of line with that of the other eye. The first symptom to arise is diplopia upon descending stairs. When the sixth nerve is involved, the eyeballs are rotated toward the median line by the internal recti muscles, thus causing a convergent strabismus. There is likewise double vision.

Amyotrophic Lateral Sclerosis

Definition.—Amyotrophic lateral sclerosis is a paralysis caused by a hardening of the cells in the anterior columns of the spinal cord and the motor fibers of the crossed pyramidal tracts. The disease was first described by Charcot and has been named **Charcot's disease** in his honor.

Adjustment.—Upper cervical adjustments are particularly indicated in this disease.

Pathology.—The structural changes consist of a progressive degeneration affecting the pyramidal tracts and the trophic cells in the ventral columns of the spinal cord. These changes may proceed centralward, involving the medulla and pons.

Symptoms.—At the onset there are sensations of weariness and heaviness in the lower extremities, or there may be a double paraplegia with wasting which begins in the hands. Since the condition most commonly develops during middle life, it closely simulates the hand type of progressive muscular atrophy. The chief difference lies in the fact that there is spasticity of the muscles and exaggerated reflexes. Both the spasticity and exaggerated reflexes result from destruction of the pyramidal tracts. After destruction of the motor and trophic cells in the anterior columns of the spinal cord, the muscles become flaccid and reflexes are lost. When walking is possible, the gait is spastic; the pelvis is tilted to remove weight from the foot which is to be pushed forward. After one forward step is made, the pelvis is tilted to the opposite side to permit movement of the other foot. Use of the arms is usually lost within a year, and the patient is generally bedridden within two years. During the late stages the tongue, lips, and pharyngeal muscles are affected, causing the symptoms which are usually found in glossolabiolaryngeal paralysis. Death is frequently caused by aspiration pneumonia.

Myelitis

Definition.—Myelitis is an inflammation of the cells and fibers of the spinal cord characterized by motor and sensory paralysis.

Adjustment.—Spinal examination will reveal disrelationship at or near the lesion of the cord. Normalization of other portions of the spine may have a beneficial effect and promote a more rapid recovery; hence, the cervical, dorsal, and lumbar areas should be carefully explored.

Pathology.—The term **central myelitis** denotes inflammation of the gray matter of the cord. **Cortical myelitis** is an inflammation of the white matter only. **Transverse myelitis** is an inflammation of all structures in the cord at any segmental level. Most cases of central myelitis are classified as poliomelitis, while cases of cortical myelitis are described under

such topics as lateral sclerosis, combined sclerosis, and amyotrophic lateral sclerosis. Most cases to which the term myelitis is applied are cases of transverse myelitis.

Trauma most commonly precedes the development of acute transverse myelitis. The spinal cord may vary in appearance from normal to that of great engorgement wherein it is difficult to differentiate between the gray and the white matter. Edema always accompanies the engorgement, and frequently hemorrhages occur. Degenerative changes develop gradually and account for the permanency of the paralysis.

In chronic transverse myelitis the changes are degenerative from the onset. In time the spinal cord becomes pale and shrunken. Pigmented areas denote previous hemorrhages. Adhesions may occur between the meninges and the cortex of the cord, and occasionally areas of calcification are found.

Symptoms.—Acute transverse myelitis begins with deep-seated spinal pain, muscular weakness, and aching in the lower extremities. There is a rise in the temperature to 101-103 degrees. Paresthesias may begin at the onset and consist of the so-called "needles and pins" sensation, formication, girdle sensation, or hyperesthesia. The fever lasts but a few days during which time the paralysis develops; the paralysis may become complete in a few days or a week's time. When the transverse lesion is in the dorsal or lumbar cord, there is a paraplegia. If in the cervical cord, there is diplegia. Sensory and motor functions are disturbed or lost. When a thoracic segment of the cord is damaged, there are anesthesia and spastic paralysis below the lesion, while there are anesthesia and flaccid paralysis at the level of the lesion. There are rectal and vesical anesthesias which cause retention of urine and constipation. The muscles usually do not atrophy and are spastic. Bed sores tend to form upon the parts of the body which contact the bed; the heels and buttocks are most commonly affected. The girdle sensation causes considerable annoyance and may be persistent. The patellar reflex is exaggerated, and Babinski's reflex is present. The sphincters of the bladder

and rectum may be paralyzed. Some cases show partial recovery; and they are characterized by spastic gait, spastic paralysis, exaggerated reflexes, and paresthesias.

When the twelfth dorsal and first lumbar levels of the cord are damaged, the activating motor cells supplying the lower extremities are destroyed. This causes a flaccid paralysis with atrophy, loss of reflexes, and circulatory disturbances of coldness and mottling of the skin.

Bastian's law holds that when the lesion is complete and high in the cervical cord, all reflexes are abolished; and the patient soon dies because of involvement of the respiratory center.

Chronic myelitis is a term which may be applied to those cases of long duration even though the onset was acute. This term is likewise applied to those cases which developed as a chronic degeneration with or without known cause. The mature symptoms are identical whether the onset was acute and inflammatory or chronic and degenerative.

Cases which are chronic from the beginning do not have fever. The motor and sensory paralysis have an insidious onset and develop gradually over a period of weeks or months. Cases which are chronic from the beginning seldom improve, while cases which were acute at the onset often show improvement.

Spina Bifida

Definition.—Spina bifida is a disease of the spine in which the posterior spinal arch fails to ossify. When this developmental defect cannot be detected without X-ray, it is usually called **spina bifida occulta.** When the aperture in the spinal canal is large, the meninges or the meninges and cord may protrude.

Pathology.—The laminæ fail to develop, hence the spinous process is absent; and the posterior surface of the spinal cord is unprotected by bone. The cleft may affect one or several vertebrae. The lower lumbar or upper sacral segments are more frequently malformed. The condition, however, does appear in the cervical and the dorsal region of the spine.

The most common protrusion is **meningocele.** The meningeal tumor consists of one or more of the layers of the meninges, containing encysted cerebrospinal fluid. The protrusion may vary from one to six inches in diameter.

In **meningomyelocele** there is a protrusion of the entire spinal cord and its coverings. The tumor is both visible and palpable though smaller than that of the meningocele.

In **syringomyelocele** the posterior half of the cord protrudes with the meninges to form the tumor. The central canal of the cord is dilated and cystic.

Symptoms.—Spina bifida is congenital though the condition may not be discovered until the protrusion attracts attention. In most cases the child fails to grow in size and strength. Many cases are underdeveloped mentally. The skin over the protrusion is glossy and tense. Invariably there is a kyphosis. Muscles innervated by the cord below the level of the protrusion are often congenitally paralyzed which precludes walking. Some cases develop paralysis at or near puberty, often becoming helpless.

A cleft spinous process should not be confused with spina bifida. Many cases have a cleft of the spinous process, grow normally, and have no symptoms. Therefore, it may be said that the cleft spinous in no way disables the patient.

Hematomyelia

Definition.—Hematomyelia is a hemorrhage into the substance of the spinal cord. It is also known as **apoplexy of the spinal cord.**

Adjustment.—Upper cervical area or in the zone of the hemorrhage.

Pathology.—Disturbances of function of the vasomotor nerves may be caused at any level of the spinal cord. In vasodilation the vessels' diameter increases to the point that both cells and serum may escape into the cord substance. This

escape may be a slow seepage, but in cases of more violent trauma it may be sudden. The effused blood exerts pressure and disturbs the function of the compressed cells or tracts.

Symptoms.—The onset is usually sudden with slight pain followed by numbness or paresthesias throughout the course of the nerves radiating from the point of hemorrhage. Pain may be severe at the onset but gradually diminishes as the hemorrhage increases. However, the paralysis becomes more pronounced as the hemorrhage continues. Some hemorrhages may be sudden with instantaneous and complete paralysis. Hemorrhage of the cord usually occurs near the central canal; thus the paralysis may be motor or sensory. Hemorrhage in the cervical portion of the spinal cord may cause a transitory loss of consciousness or a profound coma. Paralysis which results from hemorrhage may be in the form of monoplegia, paraplegia, or diplegia. In meningeal hemorrhage there are more pain, twitchings, and spasms and less paralysis than in hemorrhage of the cord. Absorption of the effused blood may lead to partial or complete recovery, depending on damage sustained at the point of the hemorrhage.

Tumor of Spinal Cord

Tumors of the spinal cord most commonly originate from the neuroglia of the cord, the meninges which cover the cord, or the vertebrae and intervertebral disks which surround the spinal canal. Tumors composed of neuroglia are known as gliomas. Tumors derived from the meninges are most commonly fibromas, while sarcomas, osteomas, and chondromas may have their origin in the vertebrae or disks.

Adjustment.—Upper cervical, local, and K. P. areas should be investigated.

Symptoms.—The symptoms are a result of irritation and compression of the spinal cord. Sensory disturbances appear first. There is usually some degree of pain at the level of the cord pressure; it is a continuous symptom during the early

stages of the disease. The pain ultimately diminishes in intensity and is replaced by a sensation of constriction known as the girdle sensation. There may be hyperesthesia at the level of the lesion and varying degrees of anesthesia below that level. One or both sides of the body may be affected, depending upon the position of the tumor and the manner in which it displaces or constricts the cord. Motor paralysis always develops. The paralysis progresses rather slowly and is always spastic in character excepting when the tumor involves the twelfth dorsal and first lumbar level of the cord. Compression of the cord above this level causes spastic paralysis, ankle clonus, loss of control of the sphincters of the rectum and bladder, and anesthesias of all types of sensation. If the tumor is situated within the cord substance, it may impair all structures in a lateral half of the cord with a resulting Brown-Sequard's paralysis. Extramedullary tumors which compress the cord may be removed and eradicate the pressure symptoms. Intramedullary tumors which cause Brown-Sequard's paralysis destroy the cord substance and usually have an unfavorable prognosis.

Syringomyelia

Definition.—Syringomyelia is a disease of the spinal cord in which cavities project from the central canal invading the cord substance and causing paralysis and atrophy.

Adjustment.—Upper cervical region.

Pathology.—Syringomyelia usually occurs in the cervical portion of the cord. Many cases are believed to be the result of a defective development wherein the posterior portion of the canal fails to close. Other cases may result from gliomas which have undergone softening and absorption. Some cases are attributed to hemorrhage of the cord, while others are ascribed to cord pressure.

Symptoms.—The onset is gradual with aching pains in the neck and arms. The muscles lying in the zone of pain become weak and undergo atrophy. As pain subsides, paresthesias

replace it. Brown-Sequard's paralysis is frequently present, denoting unilateral damage to the cord. There is anesthesia to temperature and pain with retention of tactile sensation. The muscle sense is always disturbed on the side of the lesion. When the spinal muscles are involved, spinal curvatures are a result of the muscular weakness. Damage to trophic cells in the cord explain the nutritional defects which include bed sores, spontaneous fractures, and deformities of the joints. Among the unusual forms of syringomyelia is one known as Morvan's disease in which there is great deformity of the hands. Progress of the disease is relatively slow; the duration may be several years.

Locomotor Ataxia

Definition.—Locomotor ataxia is a chronic degeneration of the posterior funiculi of the spinal cord characterized by loss of muscle coordination and sensory and trophic disturbances. It is also known as **tabes dorsalis** and **posterior spinal sclerosis.**

Adjustment.—Upper cervical and lower dorsal areas.

Pathology.—The degeneration usually begins in the dorsal funiculi of the spinal cord, beginning in the dorsolumbar enlargement. The posterior portion of the cord and the adjacent pia mater become congested and edematous. The axis cylinders are swollen and gradually destroyed. A connective tissue growth presses upon nerve substance and replaces it. The posterior nerve roots and their ganglia become involved in this degenerative process, after which all types of sensation may be lost. Peripheral nerves do not escape damage. The optic nerve is destroyed in 6% of the cases and is impaired in approximately 60% of the cases.

Symptoms.—The symptoms of locomotor ataxia are classified as belonging to three stages. The initial stage is also known as the preataxic stage or the stage of sensory disturbances. The second is the ataxic stage or the stage of lost coordination. The third stage is known as the paralytic stage or the stage of invalidism.

The **initial stage** begins with lightning-like pains of momentary duration most common in the lower extremities. These pains fleet from place to place and may occur in the trunk, arms, or head. Occasionally a herpetiform eruption occurs in the skin along the course of these fleeting pains. Paresthesias such as burning, tingling, formication, and numbness are common in the lower extremities. In walking the patient feels as if he were walking upon a thick carpet or that he has cork soles on his shoes. When the cervical cord is affected, similar sensations occur in the arms. The patient experiences difficulty in grasping objects and buttoning his clothing. The Argyll Robertson pupil may appear in this first stage: it is a condition in which there is accommodation of the eye to distance but no accommodation to light; the pupil is in the state of persistent miosis. The Argyll Robertson pupil does not appear until the cervicodorsal portion of the cord is involved.

Romberg's sign develops during the preataxic stage and becomes pronounced in the ataxic stage. The sign is said to be positive when the blindfolded patient while standing erect sways more than one and one-half inches. With the eyes closed and the arm extended, the patient is unable to place the tip of the finger upon the tip of his nose. With the eyes closed and both arms extended laterally, he is unable to bring the tips of the fingers together.

The **ataxic stage** begins when the ataxic gait is evident. During this stage the patient walks with caution. The feet are placed far apart. The head is inclined forward, and the eyes are fixed upon the walking surface and feet. The feet are raised unusually high, thrown far forward, and brought down with the sole of the foot striking first. The girdle sensation when present develops in the ataxic stage.

The **gastric crisis** may usher in the disease but more frequently occurs in periodic attacks during the ataxic stage. These attacks are marked by severe epigastric and rectal pains which are accompanied by vomiting. There may be disturbed flow of urine and irritability of the bladder.

The inability to coordinate muscular movement is due to loss of the muscle sense. In all voluntary movements the ataxic patient must supplement the muscle sense with vision; this explains the inability to walk in the dark during the ataxic stage.

The paralytic stage is characterized by marked disability. The patient is no longer able to walk; sexual function is abolished. There is marked atrophy of the extremities and spinal muscles. Special nerve disturbances as blindness prevail in some cases, while in others there is dementia.

The cardinal symptoms of locomotor ataxia are lightning-like pains, loss of the patellar reflex, Romberg's sign, Argyll Robertson pupil, partial or complete loss of sensation, and the ataxic gait.

Spastic Spinal Paralysis

Definition.—Spastic spinal paralysis is also known as **lateral sclerosis.** It is a hardening of the pyramidal tracts of the spinal cord and is characterized by a spastic paraplegia.

Adjustment.—The spinal cause of the spastic spinal paralysis is most commonly found in the upper cervical area of the spine.

Pathology.—In congenital cases there may be developmental defects in the pyramidal tracts which lead to atrophy and sclerosis. Cases which result from birth injury or follow acute illnesses of early life are more apt to be of inflammatory origin. The connective tissue elements increase and replace the nerve structures.

Symptoms.—When this condition develops within the first year of life, it is called **Little's disease.** Birth injuries are responsible for many of these cases. The symptoms may not be apparent for several months. A convulsion shortly after birth is a significant indication but is not conclusive proof of pyramidal tract damage rather than cortical damage. Other cases begin with a febrile attack during which a convulsion may

occur. As a rule, parents will state that their child has never been quite normal since the illness or the convulsion. The child may not learn to walk until two years of age or more. Dentition is delayed, and speech is imperfect or not attempted. The extremities are extended and spastic. When walking is attempted, the legs cross; and the child falls. All movements are stiff and hesitant. The reflexes are exaggerated, and Babinski's sign is present in both feet. Mild cases improve with age, and many of them fully recover under spinal adjustment. Chronic cases respond less because of the spinal cord damage.

When lateral sclerosis develops during adult life, it is known as the **spastic sclerosis of Erb,** being first described by him in 1875. The onset is insidious in the adult and progresses very slowly. There is a spastic paraplegia, but one leg is more spastic than the other or becomes spastic before the other. In walking the patient has a spastic gait. The tendon reflexes are exaggerated. Babinski's sign is bilateral. Usually there is ankle clonus. Even though the disease is progressive, the course is so slow that the patient may be able to walk for years. Sensory functions are not affected. In the majority of cases the lesion is in the dorsal enlargement of the cord, thus not influencing the upper extremities. When the lesion is in the cervical cord, the upper extremities are similarly affected. Improvement is rare, and there is no proof that treatment slows the progress of the disease.

The Combined Sclerosis

Definition.—The term combined sclerosis is applied to certain forms of myelitis in which two or more tracts of the spinal cord undergo degenerative changes. The posterior funiculi and the lateral pyramidal tracts are most commonly affected. Amyotrophic lateral sclerosis is a combined sclerosis of the pyramidal tracts and the anterior column.

Adjustment.—Adjustments are indicated in the upper cervical and lower dorsal areas of the spine.

Pathology.—In the earlier stages there are mild inflammatory changes consisting of hyperemia and edema. The nerve substance is swollen, and the neuroglia slowly thickens. The nerve sheath and the axis cylinder become broken. In due time connective tissue elements replace the nerve elements.

Symptoms.—The onset is insidious and marked by sensations of weakness, heaviness of the feet, and spasticity of the muscles of the legs. The weakness and spasticity increase, involving all parts below the level of the lesion. At the beginning the reflexes are exaggerated; but should the disease process involve the posterior columns, the reflexes will be lost. Sensory disturbances will vary with the extent of damage to the posterior nerve roots and posterior columns. Early in the disease the gait is spastic but is later modified by the ataxia. There may be a girdle sensation with motor and sensory paralysis. When the anterior horns are involved, the muscles supplied by them become flaccid and undergo atrophy. Frequently there are disturbances of vision and digestion. The disease is usually progressive for several years after which it remains stationary.

The Meninges

Meningococcic infection of the meninges is known as **cerebrospinal meningitis** and is classified among the infectious diseases. The meninges may also be the seat of growths, hemorrhage, and inflammation which is nonmeningococcic and does not occur in epidemics.

External meningitis is an inflammation involving the dura which may be associated with growths or hemorrhage. **Leptomeningitis** is an inflammation of the thin membranes of the cord; namely, the pia and arachnoid. **Meningomyelitis** is applied to those cases in which the cord substance has been invaded by the inflammatory process which originated in the meninges.

Malignant growths may develop in the dura mater or spread to it from the adjacent vertebral bodies. Subdural hemor-

rhages follow trauma in fractures of the skull or spine and may be spontaneous, or they may be related to vascular disease. Inflammations of all three membranes may be associated with mastoiditis, sinusitis, and thrombosis of the dural sinuses. Occasionally meningitis develops as a complication in pneumonia, endocarditis, septicemia, or typhoid. In most instances there is an infectious organism; the pneumococcus and the streptococcus are more commonly found.

Adjustment.—Adjustments are indicated in the segmental zone affected.

Symptoms.—When the dura mater is involved, the attack begins with severe spinal pain which radiates along the course of the spinal nerves. There are marked hyperesthesia and clonic spasms of various muscle groups. When the inflammation involves the thin membranes, there are pain and twitching but always some degree of paralysis. As a rule, the spinal muscles are tense. There may be cervical retraction, opisthotonosis, and a positive Kernig's sign. The cerebrospinal fluid becomes cloudy and contains an abundance of cells. In infectious cases these cells become purulent, and death transpires in a few days.

There is frequently marked distortion of the body due to spasticity of the muscular system, particularly affecting muscles of the spinal column and the extremities. In subacute cases the distortion due to muscular rigidity may persist for weeks after fever has subsided.

When the cerebral meninges are affected; there are headache, general hyperesthesia, cervical retraction, and opisthotonos. Evidence of intracranial pressure is indicated by strabismus, dilated pupils, cerebral type of vomiting, and convulsions.

It may be said that diseases affecting the outer layer of the meninges produce severe pain, muscular twitching, and local spasms; while those affecting the pia mater are less painful but show evidence of involvement of the underlying nervous

tissue as indicated by paralysis. Variations of symptoms are due to variation in location and the layers involved.

Traumatic cases have the best outlook for recovery unless the spinal cord has been penetrated by fragments of bone; however, many infectious cases have a subacute course and respond readily to spinal adjustments.

Apoplexy

Definition.—Apoplexy is a sudden effusion of blood into the substance of an organ. **Intracranial apoplexy** is hemorrhage within the skull. Intracranial apoplexy may be cerebral, cerebellar, meningeal, or pontine.

Adjustment.—Adjustments are indicated in the upper cervical, middle dorsal, and lower dorsal regions of the spine.

Pathology.—Intracranial apoplexy is most commonly secondary to hypertension or arteriosclerosis. Occasionally intracranial hemorrhages follow trauma of the skull. Brain hemorrhage may occur suddenly, or there may be a gradual oozing of blood for a period of several hours. The effused blood displaces nerve cells or fibers and exerts pressure upon them which interrupts their normal function.

Cerebral apoplexy most frequently occurs from a branch of the middle cerebral artery. Meningeal apoplexy most frequently occurs at the base of the brain.

Transient hemiplegia occasionally develops from a temporary dilatation of a cerebral artery. During the time of the dilatation there is paralysis. It suddenly subsides when the blood pressure is lowered and the arterial distention reduced.

Symptoms.—An attack of intracranial apoplexy is commonly known as a **paralytic stroke.** In parts of New England it is known as a "shock." Most cases are of sudden onset without premonitory symptoms. Occasionally there are prodromal symptoms of headache or pains in the head, vertigo, numbness, and tingling in the extremities.

When the onset is sudden, the patient falls and is found to

be in a state of apoplectic coma. The respirations are slow and noisy. Occasionally Cheyne-Stokes respiration develops and carries a distinctly unfavorable prognosis. There is expiratory puffing of the lips, and the respiration is distinctly stertorous. The pulse is slow, full, and of high tension. The pupils are unequal, the dilated one being on the side of the hemorrhage. There may be conjugate deviation of the eyes, usually toward the side of the hemorrhage. The mouth is drawn toward the side which is not paralyzed, thus causing the skin of the paralyzed side to be smooth and stretched. The paralyzed arm and leg can be detected by raising the two analogous extremities and permitting them to drop simultaneously. It will be observed that the paralyzed extremity drops as a piece of rope, indicating all loss of muscle tension. Usually the body temperature is slightly above normal. The surface temperature of the paralyzed side is frequently one or two degrees higher than that of the normal side. A high temperature after apoplexy is a serious omen.

The majority of cases of apoplexy are not fatal. As a rule, the coma disappears in a few hours, a few days, and occasionally a few weeks. Immediately after the coma there may be mental confusion and disturbances of speech as well as hemiplegia. It is quite common that both motor and sensory functions are impaired during the early stages. The sensory function is restored quite promptly, and there is improvement of the motor disturbances as the effused blood is absorbed. Generally improvement of the face is greatest and occurs first. Improvement in the leg is less and in the arm least. This is due to the fact that most hemorrhages occur near the center of the rolandic area which is the location of the upper motor neurons governing the arm. Improvement is markedly progressive during the first six months. It is somewhat slower during the second six months, and there is but slight improvement thereafter. Most cases are bedfast at least for two weeks. When recovery permits, the patients walk with a characteristic unilateral spastic gait, also known as the mow-

ing gait. This is an upper motor neuron paralysis and, therefore, is spastic. The patellar reflex is exaggerated on the paralyzed side, and Babinski's sign is likewise present. There is slight atrophy of the paralyzed muscles, and contractures are most pronounced in the upper extremity. If the cause of apoplexy remains uncorrected, there may be recurrences.

Absolute rest in bed is indicated in the early stage of apoplexy. The quantity of food should be small but well-balanced to insure adequate nutrition. The patient needs constant supervision until improvement permits walking without assistance.

Cerebral Softening

Definition.—Softening of the brain results from occlusion of an artery which deprives a portion of the brain of its normal nutrition. The occlusion may be caused by embolism or thrombosis.

Emboli which lodge in the cerebral vessels may originate in the lungs, left side of the heart, ascending arch of the aorta, or its branches leading to the brain. Thrombosis of cerebral vessels is most commonly encountered in arteriosclerosis. Occasionally it develops during the course of an infectious disease.

Adjustment.—Upper cervical, upper dorsal, and lower dorsal areas.

Pathology.—Thrombosis and embolism most commonly involve branches of the middle cerebral artery. If the obstructed branch is small and has anastomoses, a collateral circulation may be established without serious pathology. If an end artery is obstructed, the blood beyond the point of obstruction becomes stagnant. Those cells whose nutrition has been interrupted undergo a yellowish-white softening which may become reddened should red blood cells escape from adjacent vessels. The red cells undergo disintegration; and upon absorption of the hemoglobin the softened area becomes yellowish. The size of the softened area may vary from that of a pinhead to one to two inches in diameter.

Symptoms.—Embolism of a large vessel is marked by sudden onset with loss of consciousness as in apoplexy, and it is not uncommon for apoplexy to follow embolism. Embolism of small vessels may occur without loss of consciousness or with but slight disturbances of consciousness. If the embolus is septic, fever develops within three days. When a thrombus occludes a large cerebral vessel, the loss of consciousness may be gradual but progressive. There are usually headache, vertigo, and loss of memory. There may be despondency and absent-mindedness. Vision is often impaired, and speech is slow and hesitating. Paralysis develops gradually, usually in the form of hemiplegia. It may involve both motor and sensory functions. Frequently there is aphasia when the lesion is on the left side in right-handed persons. Paralysis and mental symptoms progress slowly, often requiring months or years to develop fully.

Abscess of the Brain

Definition.—Abscess of the brain is a circumscribed collection of pus situated within the cranium and is usually of metastatic or traumatic origin.

Adjustment.—Upper cervical, middle dorsal, and lower dorsal areas.

Pathology.—Pus emboli may be conveyed through the cerebral arteries, causing metastatic abscesses; or a pyogenic inflammation may extend from the middle ear or mastoid to the lateral sinus and thence to the meninges and brain. Occasionally abscesses follow fractures of the skull or a serious contusion. Abscess then develops providing the body harbors pyogenic organisms. Cerebral abscesses may rupture into the ventricles, or they may continue to enlarge and increase intracranial pressure until vital centers are destroyed.

Symptoms.—The onset of cerebral abscess is rather rapid with throbbing headache, mental dullness, vertigo, and fever. There may or may not be chills, but the course of the fever

is either remittent or intermittent. As intracranial pressure is increased; vomiting, choked disk, and paralysis develop. The vomiting is persistent and of the projectile type. The choked disk may be observed upon ophthalmoscopic inspection of the fundus. Paralysis will vary with the portion of the brain damaged. At first there may be a monoplegia and later a hemiplegia. Convulsions often appear, especially when the abscess ruptures into a ventricle. Mental symptoms vary and may be explained as resulting in part from the toxemia and in part from the brain damage.

Hydrocephalus

Definition.—Hydrocephalus is an excessive accumulation of cerebrospinal fluid within the cranium. When the increased fluid is within the ventricles, the condition is known as **internal hydrocephalus** or **ventricular distention.**

Adjustment.—Upper cervical, upper dorsal, and lower dorsal areas.

Pathology.—The cerebrospinal fluid originates in the choroid plexuses. It passes from the lateral ventricles through the foramen of Monro and the aqueduct of Sylvius to the fourth ventricle. From thence part of it passes into the central canal of the spinal cord and part reaches the subarachnoid space through the foramina of Magendie and Luschka. Distention of the ventricles must necessarily be caused by obstruction which prevents normal dispersion of this fluid through its normal channels. Obstruction of these small spaces may be produced by inflammations and by trauma, particularly birth injury. The head becomes large, the fontanels fail to ossify, and the scalp covering them is distended by the endocranial pressure.

Symptoms.—Hydrocephalus occurs more frequently in males and appears during the first year in life. The head enlarges, and the child becomes irritable. The posterior fontanel, which should normally close during the second month of

life, fails to close. The anterior fontanel, which should close at the twenty-second month, remains open long after the second year. The head is large, and its normal symmetry is lost. When the condition develops early, the child may never learn to walk. Nutrition is impaired, and the child appears anemic. More gradual cases do not become prominent until during the second year of life; the child may be walking before the hydrocephalus is detected. In due time walking becomes impaired, and soon this ability is lost. Cerebral vomiting, choked disk, strabismus, and diplopia may occur. Sometimes there is blindness, and occasionally there are convulsions. The majority of cases live less than two years. Occasionally a case attains adult life but is usually handicapped by the paralysis.

Infantile Cerebral Palsy

Definition.—Infantile cerebral palsy is a partial or complete paralysis which results from birth injury. It is also known as **birth palsy and infantile cerebral hemorrhage.**

Adjustment.—The atlas or the axis is most commonly disrelated and, therefore, requires corrective adjustment. Any other cervical vertebra or several of them may become disrelated during labor when the head encounters resistance at the pelvic outlet. Prolonged and difficult labor is more apt to produce this condition than instrumental delivery of the head.

Many years ago Dr. P. V. Blond, upon being called to attend one of these cases, reasoned that if he would reverse the procedure which caused the ailment, he might succeed in affording the infant relief. Accordingly with the child in a prone position on a pillow, he employed spinal traction. He placed the palmar surface and the thumb of one hand on the occipital area and grasped an ankle with the opposite hand. After slight traction, he gave a gentle thrust which had a stretching effect upon the cervical spinal ligaments. His reasoning was that the tension placed upon the cervical ligaments would tend to produce proper alignment of the cervical vertebræ.

His efforts were rewarded by prompt improvement. All muscular twitching ceased, and the infant was able to nurse within thirty minutes.

Pathology.—During the act of parturition the fetus is subjected to considerable pressure. Its propulsion is by the contractions of the uterine and abdominal muscles exerted upon the buttocks and trunk; the head encounters resistance at the pelvic outlet. If the resistance offered by the fetus exceeds the pressure produced, no injury follows. The spine and the central nervous system may be damaged if the resistance of the fetus is unable to withstand the forces imposed upon it during the act of birth. The damage may be in the cervical cord, the base of the brain, or the cerebral cortex. In minor cases this damage may consist of little more than congestion and consequent edema of the nervous structures. More severe cases, however, incur hemorrhage and pressure upon nerve tissue by the effused blood. It is estimated that one-half of the deaths among infants at childbirth is due to this condition. The remaining cases suffer from palsy, spastic paralysis, idiocy, or convulsions.

Hemorrhages in the cervical cord or medulla which damage the nuclei of the phrenic nerve or the respiratory center in the medulla are promptly fatal. Injury below this point in the cord and also that above the medulla in the brain causes most of the cases of birth palsy that survive. Damage to the corpus striatum prevents normal coordination of muscles and produces spasticity and involuntary movements. The spasticity is still more pronounced if the internal capsules are involved. When the motor area of the cortex is involved on one side, the result is a hemiplegia; but when the basal ganglia and the internal capsules are damaged, there is a spastic diplegia.

Symptoms.—There may be symptoms of damage to the nervous system immediately after birth; but occasionally days, weeks, or months pass before they are evident. The early symptoms consist of restlessness, irritability, cyanosis, muscular twitching, and inability to nurse. More advanced symp-

toms are convulsions and the inability of the child to move one or more of its extremities. Growth of the paralyzed extremities is retarded; the muscles become rigid; and the skin is often cold. This condition will always be evident by the eighth month. Contractures of the leg muscles may cause clubfoot which may be talipes equinus, varus, valgus, or calcaneus. The fingers of the affected hand are frequently flexed, and the spasticity holds the arm close to the chest. Often there is lack of mental development. The head is asymmetrical and may be either large or small. Dentition is delayed. The speech may be indistinct. The voice is childish; and as the child grows older, the thoughts remain immature.

In diplegias the child is unable to grasp objects or hold them when placed in the hand. There is evidence of but little voluntary control of the muscles. As a rule, the head cannot be held erect; and the child is not able to sit as other children by the eighth month. The involuntary movements are intensified by excitement. Walking is always late, usually between the second and sixth year of life. The more abject cases never learn to walk. Movements requiring coordinated action of the muscle groups are most difficult or impossible. Many of these cases are alert mentally, and occasionally a genius is found with this affliction.

Convulsions are not an essential feature of infantile cerebral palsy, but they do frequently result when there is cortical irritation produced by meningeal or cortical lesions. When there are convulsions, it does not follow that the case is one of epilepsy. Epilepsy is not a specific entity, and but little is known as to its cause; whereas, in infantile cerebral palsy there are definite evidences of intracranial pressure.

Tumor of the Brain

The term tumor of the brain is applied to all enlargements which are progressive in nature and situated within the cranium. Most intracranial tumors are gliomas which develop from neuroglia cells. Adenomas develop from the pituitary,

meningiomas from the meninges. A few other types are less common and include metastatic tumors which are essentially malignant. Enlargements due to tuberculosis and gummas are considered part of the respective infectious disease and are not considered as intracranial tumors.

Adjustment.—Upper cervical and lower dorsal.

Symptoms.—The symptoms vary according to the size of the growth and its location. The three most common early symptoms are headache, vomiting, and choking of the optic disk. The headache is due to the increased intracranial pressure which stretches the meninges. The vomiting is due to irritation of the vomiting center in the medulla, and the choking of the optic disk is due to cerebrospinal fluid entering the vaginal sheath of the optic nerves. In due time the fibers of the optic nerve will become constricted and undergo atrophy, at which time it will become chalky white in color and cause blindness. There are often vertigo and disturbances of the special senses. The pupils are unequal, and one or both may fail to respond to light. Diplopia results from encroachment upon a nucleus of the oculomotor, abducens, or trochlear nerves. Convulsions frequently develop; their periodicity may be explained by the fact that these tumors are in part vascular. When the vascularity increases, intracranial pressure increases, causing transient symptoms during that period of increased pressure. This may also account for transient attacks of the epileptic equivalent and temporary insanity. Such attacks most often follow excitement, overeating, and overstimulation. Paralysis in the form of monoplegia, hemiplegia, or diplegia depends upon involvement of corresponding motor areas in the brain. Reflexes are exaggerated upon one or both sides of the body, depending upon the location of intracranial pressure.

Multiple Sclerosis

Definition.—Multiple sclerosis is a degenerative hardening of the central nervous system in numerous areas, affecting both the brain and spinal cord.

Adjustment.—Upper cervical and lower dorsal.

Pathology.—The sclerotic areas are adjacent to blood vessels. At the onset these areas are congested and edematous. Later the myelin sheath undergoes thickening, and this is followed by axon destruction and sclerosis of the invaded area. Transient symptoms may result from the hyperemia and congestion; but if the disease process can be halted prior to the development of the sclerosis, all symptoms may be obliterated. The sclerotic changes involve chiefly motor tracts and cells.

Symptoms.—Most patients are unable to recall when the condition began. The first symptom to attract the attention of the patient is tremor which becomes intensified in the performance of the finer voluntary movements. Occasionally there are minor pains in the back and legs. Spasticity in the muscles of the lower extremities is common, while the sensory disturbances are minor. The deep reflexes are increased. The patient becomes fatigued upon voluntary effort. Nystagmus is regarded as a cardinal symptom. There is often some degree of ataxia which modifies the characteristic spastic gait. The speech is slow and scanning, there being a distinct hesitation between the syllables. Memory is impaired which frequently causes the patient to forget the subject under discussion, hence their conversations may have no regular sequence of topics. When walking becomes impaired, there is a great tendency to stumble, especially when walking upon an uneven surface. As the disease advances, walking becomes difficult or impossible; and the tremor, which heretofore has increased upon excitement and voluntary effort, now becomes constant. In rare instances the tremor involves the muscles of the neck, producing a nodding. Vision is poor and usually results from atrophic changes in the optic nerve.

The disease is most common in women and usually begins in the early thirties. During the earlier years there is often spontaneous improvement, and occasionally the spastic gait entirely disappears. This improvement is transient and the

typical spastic and ataxic gait again prevails. In advanced cases there may be mental impairment and melancholia. The disease follows a very chronic course and is subject to wide variations during that period of time.

Lead Poisoning

Definition.—Lead poisoning results from the absorption or ingestion of lead in sufficient quantity to injure human tissues.

Adjustment.—Middle and lower dorsal should be adjusted in combination with local zones in which symptoms are evident. These patients who contact lead in their work should change occupations.

Symptoms.—Lead poisoning may be acquired in drinking water, wine, or milk that has been contained in lead vessels or pipes. It is common among painters, miners, molders, and printers who handle lead. It is believed that lead is absorbed through the skin and may be inhaled in minute amounts during respiration.

Lead colic is the term applied to acute lead poisoning which has a sudden onset and is characterized by severe gastralgic pain in the umbilical area. The pain closely resembles that of gastralgia or enteralgia. The abdomen is tender and often distended, and there may be both vomiting and diarrhea. Pain is believed to result from the pressure of lead upon nerve endings in the alimentary tract.

When lead poisoning is chronic, the condition develops gradually over a period of years. It tends to produce anemia and a blue line on the gums. The anemia is characterized by pallor and a deficiency of red cells. The patient becomes emaciated, and his muscles are somewhat flaccid. The mouth is constantly dry and has a metallic taste. The tongue is coated, and halitosis is persistent. There are usually gastric and intestinal disturbances and occasionally attacks of lead colic.

Lead is an accumulative poison, and it may spread from the alimentary tract through the circulation to joints, muscles,

nerves, or brain. In lead arthralgia there is pain upon movement of the joint. In due time the overlying skin becomes erythematous and the muscles contracted. There may be deformity of the bone which usually forms exostoses. The numerous changes occurring in and around the joint cause marked limitation of movement.

When lead becomes deposited in the nerve or at nerve endings, paralysis ensues. Paralyzed muscles undergo atrophy and are flaccid. The reaction of degeneration appears early. The extreme flaccidity may permit dislocation. Paralysis is usually in the form of a monplegia but may affect both lower extremities.

Encephalopathy results when lead is deposited in the brain. The symptoms are those of an encephalitis but vary according to the portion of the brain which has been damaged. In some cases facial palsies result from basilar disturbances, while in others there may be dementia or upper motor neuron disturbances from involvement of the cortex. Delirium followed by convulsions and coma is not uncommon. Sometimes an interval of sleep results in decided improvement. Convulsions are thought to result from irritation of the cortex or the meninges covering the motor area. Convulsions are similar to those of epilepsy and are followed by coma and mental dullness.

Sunstroke

Definition.—Sunstroke or heat stroke is a condition of coma which results from the inability of the nervous system to cope with the effect of heat or the sun's rays upon the body.

Adjustment.—Middle and lower dorsal adjustments tend to increase the efficiency and normalize imbalances in the production and dissipation of heat.

Symptoms.—Sunstroke begins suddenly with coma. The temperature is above 106 degrees. The skin is flushed and excessively hot. The pulse is strong and of high tension. The respirations are deep and stertorous. The cornea is insensi-

tive. Sunstroke affects people outdoors and exposed to the direct rays of the sun. The condition develops during summer months only. Irregularity of the pulse and Cheyne-Stokes respiration are regarded as serious symptoms leading toward fatality. Favorable cases have a decline in the temperature in 24 to 48 hours and slowly recover. These cases are unable to withstand very hot weather after an initial attack.

Heat Exhaustion

Definition.—Heat exhaustion is a state of collapse which results from impairment of the heat regulating nerve mechanism when the body is subjected to a high degree of heat with high humidity.

Adjustment.—Upper, middle, and lower dorsal areas.

Symptoms.—Heat exhaustion may occur in any season of the year whether the heat results from hot weather or whether it emanates from a furnace or a forge. The onset is more gradual than that of sunstroke. It begins with dizziness, discomfort in the head, nausea, and vomiting. Sensations of chilliness or heat may flash along the spine. The skin is pale and the pulse is rapid and feeble. Respirations are shallow and increased in frequency. There may be painful muscular cramps in the extremities or abdomen. These are usually prevented by adequate intake of salt during hot weather. The loss of consciousness is rare in heat exhaustion and naturally is a grave symptom.

SECTION V—CHAPTER XV

DISEASES OF THE EYE

Hyperemia of the Conjunctiva

Definition.—An overfullness of the conjunctival vessels without thickening. It is also called **dry catarrh.**

Adjustment.—Upper cervical.

Symptoms.—This may be a symptom of chronic conjunc-

tivitis or may be primary in itself. When primary, the predominating symptoms are heavy yet, hot, painful lids, more pronounced when the eyeball is moved. There is an increased flow of lacrimal fluid and sensitiveness to light. Upon inspection the under surfaces of the lids are found to be highly congested and slightly swollen. There is no discharge other than that produced by lacrimation.

Simple Conjunctivitis

Definition.—An acute catarrhal inflammation of the conjunctiva, characterized by a slight swelling of the lids and a mucopurulent secretion.

Adjustment.—Upper cervical and K. P.

Pathology.—The ocular and palpebral conjunctiva become hyperemic and swollen, giving off an exudate of transformed mucous, fibrin, and granular debris.

Symptoms.—Catarrhal conjunctivitis may be unilateral or bilateral and is often associated with coryza. It begins with burning sensations, lacrimation, and slight swelling. The inflamed surface gives off a sticky transformed secretion, which often hardens during the night, thus sealing the lids together. The lids become markedly thickened, and their movements are painful. The eye is sensitive to light, cold, and wind. The duration is from eight to ten days and the prognosis is always favorable.

Mucopurulent Conjunctivitis

Definition.—Mucopurulent conjunctivitis is a contagious inflammation of the conjunctiva characterized by hemorrhage and a purulent discharge. It is also known as **hemorrhagic conjunctivitis** and **pink eye.**

Adjustment.—Upper cervical with K. P.

Pathology.—It begins with a marked degree of congestion of the conjunctival vessels, some swelling, and abundant mucopurulent exudate. This is followed by a subconjunctival petechia.

Symptoms.—This form of conjunctivitis is always bilateral, although one eye may be affected before the other. The beginning is with burning pain in the lids and a thick glue-like secretion from the eye, which cements the lids together during sleep. By the third day the lids are greatly swollen; and the ocular conjunctiva is bright red, hence the name, pink eye. This marks the height of the condition. Close inspection will reveal that many small hemorrhages have taken place. The exudate always retains its stringy appearance as it contains much mucin. In about four per cent of the cases there is the formation of a pseudomembrane, which makes the condition resemble diphtheria. The total duration is about ten days, and the prognosis is favorable.

If the exudate becomes purulent, the pus destroys the mucin and its stringy character is then lost. The term **purulent conjunctivitis** is then applied to this condition, but purulent conjunctivitis may develop in other forms of the disease.

Gonorrheal Conjunctivitis

Definition.—A gonorrheal inflammation of the conjunctiva.

Adjustment.—Upper cervical and K. P.

Pathology.—The conjunctival vessels are engorged early and the superficial layers of the conjunctiva are infiltrated with serum and leucocytes. Later there is a purulent discharge from the free surface.

Symptoms.—This begins with swelling of the lids, which acquire a dark red hue. There is a gritty sensation with smarting and burning. In three days the height of the acute stage is reached, the lids being enormously swollen. The upper lid often overlaps the lower, and the secretion, which at first is thin and watery, becomes thick and purulent and flows down over the cheeks. The ocular conjunctiva becomes markedly edematous, producing **chemosis**; and the chemotic tissue often overlaps the cornea, giving lodgment to exudate in the sulcus thus formed. The accumulated exudate in its

process of decomposition often involves the cornea, causing corneal ulcers. In one or two weeks the acute stage merges into the subacute. In the subacute stage the swelling and secretion are greatly diminished, and the conjunctiva is pale and flabby. Use of the eyes still brings on pain with increased secretion. If the condition becomes purulent, there are always corneal ulcers, which in the healing process leave scars, greatly interfering with vision.

Gonorrheal conjunctivitis in the newborn develops within the first three days and is usually called conjunctivitis neonatorum or ophthalmia neonatorum.

Diphtheritic Conjunctivitis

Definition.—A severe, acute inflammation of the conjunctiva, characterized by intense swelling, thickening, and hardening of the lids and by the presence of a pseudomembrane.

Adjustment.—Upper cervical and K. P.

Pathology.—This begins with a congestion of the vessels of the conjunctiva, which is soon followed by an exudate of leukocytes and fibrin upon its free surface. This exudate is firmly attached to the superficial cells and encloses epithelial cells, blood corpuscles, and various forms of bacteria.

Symptoms.—In typical cases the onset is sudden. It begins with discomfort, lacrimation, and congestion. Within twenty-four hours the upper lid may have attained four or five times its normal thickness. It becomes shiny and assumes a dusky red color. The lid is hard to the touch, closes the eye completely, and cannot be easily raised or everted. A serous exudate tinged with blood often oozes from between the lids during this stage. There is a sensation of great tension upon the globe, but there is little pain. Upon raising the lids the pseudomembrane will be found upon the palpebral and ocular conjunctiva. It is gray in color, closely adherent, and about one mm. in thickness. Forcible removal of the pseudomembrane will leave a raw, bleeding surface, which is soon covered

with a new coat of exudate. The acute stage lasts about seven days, during which time there may be slight fever with its accompanying symptoms. In time the exudate becomes purulent, and the membrane sloughs in small places until the conjunctiva is clear. Corneal ulcers are the most common complication.

Granular Conjunctivitis

Definition.—An inflammation of the conjunctiva, characterized by the formation of numerous, oval granulations upon the palpebral conjunctiva. When the conjunctiva is not hypertrophied, these granulations resemble frog's spawn, to which they are frequently compared.

Adjustment.—Upper cervical in combination with K. P.

Pathology.— The blood vessels become enlarged, the conjunctiva becomes swollen, and the lymphoid follicles develop into papilla-like projections. Small cysts may develop and scar tissue forms as the result of their erosion.

Symptoms.—This disease is also called **trachoma, granular eyelids, granular ophthalmia, military ophthalmia** and **Egyptian ophthalmia.** Its symptoms are divided into three stages: The **first stage** may begin as catarrhal conjunctivitis, having more marked swelling, discharge, and hypertrophy; or it may begin with slight thickening of the lids and abundant development of minute granules which can be seen upon everting the lids. But most commonly it has a very gradual onset with redness of the conjunctiva and margins of the lids, which is accompanied by lacrimation, scanty discharge, and a burning sensation. The lids may be stuck together upon awakening. By the end of a week the pain and irritation have greatly increased. By the end of the second week the conjunctiva has become markedly hypertrophied and studded with small granules. By the sixth week the hypertrophy lessens, and a marked congestion prevails, which becomes chronic and gradually merges into the second stage, a stage of commencing atrophy with persistent granulation.

The **second stage** is commonly called the granular stage. In this stage hypertrophy of connective tissue has ceased, and bands of cicatricial tissue begin to appear. The follicles lose their character and coalesce. Masses of lymphoid tissue cover the under surface of the lids, especially the upper one. The area of the conjunctiva is lessened by contraction of the proliferating connective tissue. The margin of the lids may remain thick, and the upper lid droops forming a partial ptosis. There is marked irritation of the cornea, produced by the rough granular lids moving over it. This gives rise to excessive vascularity of the superficial layer of the cornea, which is known as **vascular pannus.** It may be limited to a small part of the cornea but in a severe case involves the entire surface. If this condition is prolonged, superficial ulcers may form with photophobia, spasms of the orbicularis palpebral muscle, and tilting of the head forward. There is but slight exudate and much lacrimation. This stage gradually merges into the third stage.

The **third stage** is spoken of as the stage of atrophy. All lymphoid tissue has disappeared. The conjunctiva, with the exception of a few localized spots, has lost its function. The cornea is partly or completely opaque, and vision is impaired or totally abolished. The lids, however, may remain thick, deformed and have but few misplaced cilia.

The first stage lasts from three months to a year or more. The second stage rarely requires less than ten years to reach the stage of atrophy. In almost all cases the patient has reached middle life before the appearance of this stage. The stage of atrophy is usually permanent. The results in the first and second stages under Chiropractic adjustments are good.

Pterygium

Definition.—A peculiar wedge-shaped mass of hypertrophied conjunctiva, which develops in the horizontal meridian of the eyeball.

Adjustment.—Upper cervical.

Pathology.—It is composed of loose connective tissue, rich with blood vessels and fatty deposits. The epithelial layer of the conjunctiva is thickened. It is usually preceded by the formation of a small yellowish elevation in the ocular conjunctiva, called a pinguecula. This is later embodied in the pterygium.

Symptoms.—It usually develops at the inner angle of the orbit with the apex extending toward the pupil and the base lying at the caruncle. Its upper and lower borders overlap the conjunctiva and are not attached to it. The apex advances toward the pupil but does not pass its center. There is no pain unless the structure becomes inflamed. It is most commonly found in male adults, especially those employed as miners, stone masons, laborers, and other occupations in which the eye would be subject to injury by small particles of hardened material. Most cases result from minor injuries of this character.

Xerosis

Definition.—A dryness of the surface of the conjunctiva, also called **xerophthalmus.**

Adjustment.—Upper cervical and K. P.

Symptoms.—This may be a secretory neurosis of the lacrimal glands or occur as a result of general malnutrition; but it is often symptomatic and due to atrophy of the conjunctiva as in trachoma. It may occur as a mild or severe affection and is characterized by triangular masses of foamy secretion, not moistened with tears, located at the margin of the cornea. The conjunctiva is lusterless but may become red due to the irritation of the dry lid moving over it. It is most common in adults but may occur in children. The prognosis in mild cases is favorable but when due to the third stage of trachoma is unfavorable.

Superficial Keratitis

Definition.—An inflammation of the conjunctival layer of the cornea, most commonly found in subjects of disordered nutrition. It is called **phlyctenular keratitis.**

Adjustment.—Upper cervical with K. P.

Pathology.—This condition begins by the formation of a phlyctenule, an elevation resembling a vesicle. On cross section it is found to consist of a collection of small round lymphoid cells, which break down, are discharged, and form a superficial ulcer, which is rapidly covered with a fresh layer of epithelium. In most cases there is no permanent defect, unless the ulcer affects the deep structures of the cornea.

Symptoms.—The disease begins by the formation of a small yellowish-white elevation one to three mm. in diameter, which may occur at any place on the cornea but usually near the margin of the sclerotic coat. There may be two or three of these phlyctenules. The conjunctival vessels, which extend from the caruncle to the phlyctenule, become greatly engorged, forming a triangular-shaped area of redness, known as a vascular pannus. In mild cases there is but slight discomfort and inability to use the eyes as much as usual. In severe cases, photophobia, blepharospasm, supraorbital or temporal pain, and lacrimation are all present. In the ordinary case upon subsidence of the inflammation the cornea clears up, leaving no visual defect. In the more severe cases the cornea may remain opaque, but this opaqueness will gradually disappear in one to two years.

Suppurative Keratitis

Definition.—An inflammation of the cornea with the formation of pus.

Adjustment.—Upper cervical and K. P.

Symptoms.—The inflamed portion of the cornea becomes swollen and assumes a pearly gray color, which later becomes yellow and may spread. When remaining circumscribed it forms an abscess of the cornea. This terminates by its anterior wall breaking down, discharging the pus, and leaving a corneal ulcer. These ulcers may heal in a few days without leaving the cornea opaque. They can be detected upon inspection. The sides and bottom of the ulcer are covered with a

detritus of dead corneal tissue and pus, having a yellowish color. The adjacent parts of the conjunctiva become red and congested, with a marked degree of swelling around the base of the ulcer. At times there is great pain, photophobia, and lacrimation. If the ulcer should perforate the cornea, the appearance of pus may be seen at the bottom of the anterior chamber and is known as **hypopyon.** This perforation permits the aqueous humor to escape and the iris falls forward, often producing an **anterior synechia.** The anterior chamber may again fill with the aqueous humor, leaving the iris adherent to the cornea in front of it. Should the pus and toxins of the keratitis be absorbed and spread throughout the eye, a condition of panophthalmitis is produced with final atrophy of the entire eyeball. In mild cases the prognosis is favorable under adjustments; but when severe complications with deformity develop, the outlook is not good as regards recovery.

When the cornea is the seat of a gradual inflammation without the destruction of tissue but with opaqueness of the cornea, it is said to be **interstitial** or **parenchymatous keratitis.** Many such cases are believed to result from syphilis and when associated with this disease often have Hutchinson's teeth and other evidences that would lead one to suspect the disease.

Hordeolum or Sty

Definition.—There are two forms, internal and external. An external sty is an acute inflammation of the hair follicles in the skin of the eyelid. An internal sty is an acute inflammation of the meibomian glands.

Adjustment.—Upper cervical with K. P.

Symptoms.—A sty begins rather suddenly with edema, redness, and an uncomfortable irritation, which becomes painful upon movement of the lid. A hard lump or point or induration is felt near the margin of the lid. At first this lump is red but within a few days changes to yellow, and the abscess points. In the external variety the pointing takes place through the skin near the margin of the lid. In the internal

variety the pointing takes place upon the surface of the palpebral conjunctiva. As soon as the abscess sac ruptures, the pus is discharged and the symptoms rapidly abate. This condition is analogous to acne of the skin and is most commonly found in young people who are poorly nourished or are the subjects of anemia or poor elimination. The prognosis is favorable.

Blepharitis

Definition.—An inflammation of the eyelids, affecting principally their margins. It may be simple or ulcerated.

Adjustment.—Upper cervical with K. P.

Pathology.—In **simple blepharitis** there may be various degrees of severity, ranging from a slight redness with swelling to destruction of normal structures by the proliferated connective tissue. In **ulcerated blepharitis** there are hyperemia, swelling, and deformity of the lids with the formation of thin crusts, beneath which are shallow ulcers.

Symptoms.—In **simple blepharitis** or **blepharitis squamosa** the margin of the lid is bordered with a red fringe; and fine bran-like scales form around the roots of the cilia. There is a marked tendency for the cilia to drop out, but they readily grow in again. When the scales are removed, the underlying skin is red but not moist or ulcerated. Upon awakening in the morning the lids may be fastened together with a waxlike secretion from their borders. This is readily removed, and these cases respond readily to the adjustments.

In **ulcerative blepharitis** there is great redness, some swelling, much moisture, shedding of the lashes, and formation of crusts. When the crusts are removed, the ulcerations can be seen. Many yellowish white spots form, each of which is perforated with a hair. When the hair is pulled out, a small round drop of pus will be found adherent to its root. Still deeper is found a small ulcerated base extending into the hair follicles. The eye lashes are removed with very little traction. As the

disease progresses, each hair follicle is successively involved by this ulcerative process, until they are all destroyed. New lashes may grow to take the place of those lost; but they are few, small, misplaced, and deformed. As a result of the cicatricial contraction, the lashes may become turned backward upon the eyeball, a condition called **trichiasis.** The lower lid may be everted due to the contraction of the hypertrophied connective tissue. This permits the tears to flow over the lid. Such an eversion of the lower lid is called **ectropion.** When blepharitis reaches this stage, there is little chance of restoring the lid to its normal condition.

Chalazion

Definition.—Enlargement of the mebomian glands due to inflammatory obstruction of their ducts, also called **meibomian cyst, tarsal tumor, tarsal cyst** and **cystic tumor of the eyelid.**

Adjustment.—Upper cervical with K. P.

Pathology.—This begins with the structural changes of inflammation in the meibomian glands, which obstruct their ducts, preventing the excretion of the sebaceous material. The contents thus retained solidifies and undergoes fatty degeneration. Chalazions may be single or multiple.

Symptoms.—A tarsal cyst may have a sudden or a gradual onset. In the former the cyst develops rapidly with much inflammation and tenderness, which causes it to resemble a sty in its early stages, but it does not point. The cases of gradual onset develop so insidiously that the patient is unaware of the existence of an enlargement until it is palpable. The overlying skin is white; especially is this true when the cyst is on the upper lid, as the tension of the lid upon the enlargement renders its capillaries anemic. Upon palpation it will move freely with the lid, but it is found to be firmly attached to the tarsus. The fact that it does not point and runs a chronic course distinguishes it from a sty. A chalazion is analogous to a wen on the scalp.

Blepharospasm

Definition.—A tonic or clonic contraction of some or all of the fibers of the orbicularis palpebrarum muscle.

Adjustment.—Upper cervical.

Symptoms.—This is a motor neurosis and may affect one or both eyes and one or both lids of each eye. There are many instances of slight cases characterized by a frequent contraction or twitching of a few fibers in one lid, which can be readily seen by an observer. In the more severe cases the contraction involves the entire muscle, causing the lids to close tightly and violently.

There are two forms of blepharospasm, **clonic** and **tonic.** In the former the spasm is of momentary duration and consists of a series of forcible, uncontrollable blinkings. In the tonic variety there is a violent closure of the lids, which may persist for minutes, days, or even months. Blepharospasm may be symptomatic of chorea or hysteria and will increase under excitement. Other cases may be primary and may or may not be associated with refractive disturbances or other diseases of the eye. The adjustment would be in the upper cervical region as the diseases of which it is symptomatic are caused by subluxation in this region.

Ptosis

Definition.—A drooping of the upper eyelid due to paralysis of the levator palpebræ superioris muscle. This is also known as **blepharoptosis** and **blepharoplegia.**

Adjustment.—Upper cervical.

Symptoms.—Ptosis may be congenital or acquired. When congenital it is usually due to a malformation of the lid, eyeball, or orbit. The upper lid may be prevented from raising due to a thickening or increased weight as might occur in blepharitis, granular conjunctivitis, or tumors. It is usually due to paralysis of the levator muscle, which is supplied by the

oculomotor nerve. It may be associated with strabismus, in which case they have a common cause. When associated with hemiplegia, and developing with it, it may be due to an intracranial hemorrhage, which causes pressure upon the origin or path of the third cranial nerve. In bilateral ptosis the peculiar pose of the head, which is thrown back to enable the patient to look under the drooping lids, is strikingly characteristic.

Congenital Anomalies of the Iris

Heterophthalmos is a congenital condition of the irises in which they differ in color. One iris may be blue and the other brown, or one iris may display two colors.

Persistent pupillary membrane is the remains of a membrane which occupied the pupillary field during fetal life. What is seen of this membrane consists of a number of fine pigmented threads, extending from one point of the pupillary margin of the iris to an opposite point of the margin. It is rarely found in both eyes, and it frequently occurs in the newborn but disappears early in life by undergoing atrophy.

Coloboma of the iris is one of the most common malformations found in the eye and consists of an oval shaped fissure or gap in the iris, which has the effect of prolonging the pupil in the direction of the fissure, usually downward and inward. This condition may be unilateral or bilateral and is due to incomplete closure of the ocular fissure. The same condition may exist in the choroid, lens, and retina. A congenital coloboma can be differentiated from an artificial one by the fact that in the latter there is the absence of a sphincter pupillæ muscle, it having been excised along the margin of the coloboma.

Irideremia or **aniridia** is a partial or complete absence of the iris. When the iris is completely absent, the entire lens can be seen, it being so prominently exposed that even in case of cataract there is still vision. This is because there is space between the edge of the lens and the ciliary processes for light

to pass. When the condition is incomplete, there is an absence of the iris at certain points, while small segments may be present at other points. When cataract is found associated with aniridia, it is usually congenital. Myopia, astigmatism, amblyopia, and cloudy cornea are other conditions which are frequently associated. When there is a narrow rim of iris extending from the scleral border, it is called a rudimentary iris and is not irideremia.

Dyscoria is a condition in which the pupil is irregular or faulty in shape and is usually produced by excrescences on its margin.

Mydriasis is a motor disturbance of the sphincter pupillæ muscle, caused by an upper cervical subluxation, which is characterized by persistent dilatation of the pupils. **Miosis** is a motor disturbance, having a similar cause, and is characterized by persistent contraction of the pupil.

Hippus is also a motor disturbance, characterized by constant dilatation and contraction of the pupil, or it is clonic spasm of the sphincter pupillæ muscle.

Iritis

Definition.—An inflammation of the iris.

Adjustment.—Upper cervical with K. P.

Pathology.—The iris is thickened due to an infiltration of serum and round cells and discolored due to the hyperemia of blood vessels. The exudate given off from the anterior surface is serous in character. When given off from the posterior surface it is composed of fibrin and leukocytes. When synechia takes place, the iris gradually becomes atrophied.

Symptoms.—The iris assumes a reddish color, which is produced by the hyperemia and by the aqueous humor becoming infiltrated with the soluble coloring matter of the blood. The exudate may be excreted from the posterior surface of the iris into the posterior chamber, causing adhesions between

the capsule of the lens and the posterior surface of the iris, a condition known as **posterior synechia.** When this is the predominating condition, it is called **plastic iritis** or **iritis simplex.** This begins with pericorneal congestion that may be slight or so severe that it produces chemosis. The pupil is contracted and does not respond to the usual tests. There may be exudate in the anterior or posterior chambers, making the cornea appear opaque. When the pupillary field is completely filled with exudate, it is known as **occlusion** of the pupil. In some cases the entire pupillary margin of the iris may become adherent to the lens and is known as **seclusion** of the pupil, a severe form of posterior synechia.

When the exudate is confined to the anterior surface of the iris, it is called **serous iritis.** The exudate may drop into the anterior chamber, forming a whitish spot at its bottom, which is called hypopyon. The serous exudate contains some solid substances which become deposited upon the posterior surface of the cornea, making visible granular spots. The aqueous humor becomes cloudy, and the patient may complain of misty vision. In this form there is no chemosis or noticeable congestion around the cornea. It is often of a temporary character and like plastic iritis has a favorable prognosis under adjustments.

When the iris becomes swollen and thrown into folds by a retention of the exudate in its substance, it is called **parenchymatous iritis.** The swelling, which is always present in this form, is often circumscribed and presents an appearance of small nodules within the iris. The conjunctiva may become red, swollen, and sensitive. A part of the exudate may find its way into the anterior chamber, forming an hypopyon. It is important to remember that the hypopyon of iritis differs from that of keratitis in that it is much thinner, changes its position with every movement of the head, and undergoes such rapid absorption that it may disappear in a few hours. Pain is the most common subjective symptom and may be localized in the eye, brow, or temple. The severity of the pain does not always indicate the seriousness of the iritis, in which

it is present. Usually plastic iritis has much more pain than parenchymatous, yet plastic iritis is a much less serious affection. There are considerable lacrimation, photophobia, and visual disturbances, varying according to the opaqueness of the aqueous humor and to the amount of exudate in the pupillary field. The prognosis in parenchymatous iritis is not as favorable as in the two preceding forms.

Congenital Deformities of the Choroid

Coloboma of the choroid is an anomaly that is frequently associated with the same condition of the iris. It is usually congenital but is sometimes caused by traumatism. Ophthalmoscopic examination shows the exposed sclera through the aperture in the choroid. It most commonly forms near the optic nerve and may involve the retina as well as the choroid. When the retina is not involved, its vessels can be seen crossing over the coloboma of the choroid.

Albinism is a partial or complete absence of pigment in the choroid and is a congenital deformity. The pupil has a reddish luster and is smaller than normal. The iris appears red because the light is not absorbed owing to the lack of pigment, hence it gives a reddish reflection. The vessels of the retina and choroid are plainly visible with the ophthalmoscope. There is usually photophobia and often visual defects.

Choroiditis

Definition.—An inflammation of the choroid coat of the eyeball, which may be exudative or suppurative.

Adjustment.—Upper cervical with K. P.

Pathology.—In the **exudative** type the vessels are engorged with blood. The surrounding tissues are filled with round cells, and small open spaces containing fibrin may be seen. Hemorrhages may occur, and late in the disease there is proliferation of connective tissue with atrophy of the choroid.

In the **suppurative type** the choroid and retina are enor-

mously thickened, being filled with round cells, pigment, and coagulated material. The purulent exudate finds its way into the vitreous body and so mixes with it that the whole body is converted into a homogeneous mass. During absorption of the pus it comes in contact with practically all structures of the eyeball. In the late stages it may produce a panophthalmitis.

Symptoms.—In the **exudative** or simple type, ophthalmoscopic examination will show yellowish-white spots scattered over the red fundus of the eyeball. Later this yellowish color disappears, leaving white spots; this indicates that the choroid has lost its pigment, exposing the sclera. When there are many small spots of this character, the condition is called **disseminated** choroiditis. The vitreous body may contain numerous dust-like spots and floating membranes which produce floating specks before the eyes, or **scotomata** in the field of vision. There are always visual disturbances consisting of photophobia, loss of acuteness, narrowing of the field of vision, and floating specks before the eyes. The disturbances of vision result partly from the opacities in the vitreous body and partly from the involvement of the retina, which is injured to some extent in most all cases. When the exudate is localized in the macular region, it is called **central** choroiditis and always has marked visual disturbances.

Suppurative choroiditis begins suddenly with redness and swelling of the lids, conjunctiva, and cornea. The lids may be swollen closed, movements of the eyeball greatly lessened, and the cornea cloudy. A yellowish reflection can be seen in the pupil, which is due to the presence of pus in the vitreous body. Hypopyon and anterior synechia may both be present. The intra-ocular tension is increased, causing the pupil to be dilated; and the anterior chamber may be shallow. There is intense throbbing pain in the orbit and brow. The sight is completely lost and the eyeball finally atrophies. The prognosis of this form is unfavorable because drainage of the pus is difficult without coming in contact with the many very delicate structures of the eye.

Glaucoma

Definition.—A disease of the eye, characterized by opacity of the vitreous humor, increase in the intra-ocular tension, and cupping of the optic disk, producing total blindness.

Adjustment.—Upper cervical and K. P.

Pathology—A variety of conditions may contribute to the production of structural changes observed in the eye; but whether they be inflammations, congestions, or growths, the condition ultimately produced prevents normal drainage of fluid from the eyeball. This obstruction often affects Schlemm's canal in the angle of the anterior chamber, so that the exuded lymph cannot be properly drained but is retained within the eyeball, raising the intra-ocular tension and causing opacities of the vitreous humor. The following conditions have been observed in eyes having glaucoma: edema of the cornea; rigidity and fatty degeneration of the sclera; obstruction of the angle of filtration, Schlemm's canal, and the spaces of Fontana; atrophy of the iris; atrophy of the ciliary body; fluidity and opacity of the vitreous humor; atrophy of the choroid; destruction of one or more layers of the retina with its detachment; and excavation of the optic nerve.

Symptoms.—Glaucoma may be primary, secondary, or congenital. Primary glaucoma may be acute inflammatory, subacute, chronic, and simple or noninflammatory.

Acute inflammatory glaucoma has a prodromal stage which is characterized by mild attacks in which the cornea is slightly steamy, the pupil is dilated and sluggish, there is hazy vision with rainbows around lights. The eyeballs may feel abnormally firm under palpation, and the retinal arteries may be seen to pulsate upon ophthalmoscopic examination. The prodromal stage may last months or years, coming on in attacks of a few days' duration each, with intervals of abatement. During these intervals there are no symptoms displayed, but the patient requires a stronger reading glass than before the attack.

The **glaucomatous attack** comes on suddenly with severe and excruciating pain in the eyeball and corresponding side of the head, which may be accompanied by vomiting, fever, and even loss of consciousness. The lids become puffy and the ocular conjunctiva reddened. The hazy vision is most marked near the center of the visual field and sometimes exists in spots. The cornea becomes insensitive and the pupil is dilated, having a greenish reflection from the lens, hence the word glaucoma, which means sea green. Dilatation of the pupil is not uniform, therefore it is never exactly circular in shape. The iris is discolored and the humors are turbid. The sight rapidly fails until the patient can scarcely recognize objects. Palpation of the eyeball will show a decided hardness. The intensity of the above symptoms begins to subside after a few days or weeks, but the pupil remains dilated and vision poor. The patient may remain in this condition without any change for some time and is said to be in a **glaucomatous state.** After an interval of mitigation another outbreak occurs, or several successive attacks may occur, after which the sight is totally destroyed; this is known as **absolute glaucoma.** The eye assumes a dull, expressionless look; the cornea is surrounded by a zone of slaty hue; the lens and iris are crowded against the cornea; and the tension of the eyeball is excessive. At this stage excavation of optic nerve reaches the maximum, and with the total loss of sight the pain usually subsides. In some cases of acute glaucoma the patient becomes totally blind with the first and only attack, constituting what is known as **glaucoma fulminans.** After glaucoma becomes absolute, tissue changes are manifested in all structures of the eye. The lens becomes opaque and is known as glaucomatous cataract. The retina becomes detached, the iris and sclera atrophy, and in time the entire eyeball is greatly decreased in size.

The **subacute** form presents the same symptoms and mode of onset as the acute but progresses more slowly and is less severe.

In **chronic inflammatory glaucoma** the appearance of the

eye is very characteristic. The dull red color of the sclera with its swollen veins, the smoky look of the cornea, the irregular dilatation and eccentric position of the pupil, the atrophy of the visible portion of the iris, the marked shallowness of the anterior chamber, and the greenish reflection from the lens combine to form a picture which once seen can always be recognized. Central vision slowly fades and the visual field gradually contracts. The disease proceeds until the condition of absolute glaucoma is reached.

In **noninflammatory glaucoma** the onset is the most insidious of all eye diseases. In the earliest stages there are no symptoms. After a lapse of months, perhaps years, there may be slight dilatation and inactivity of the pupil and a slight increase in the tension of the eyeball. This may be accompanied by haziness of the cornea with diminished sensibility. Vision becomes greatly impaired, but central vision may be well preserved until late in the disease, enabling the patient to read fine print although not able to see to walk. Total blindness comes on suddenly. Cupping of the optic nerve is the most prominent objective symptom and is present long before total blindness is produced.

Secondary glaucoma is the name applied to a condition in which the cardinal symptoms of glaucoma develop during the course of some other disease or injury. It often occurs in perforating wounds of the cornea, suddenly closed corneal fistula, serous iritis, choroiditis, traumatic cataract, intra-ocular tumors, and contusions of the eyeball. If glaucoma develops in one of the above conditions and is accompanied by hemorrhage, the condition would be known as hemorrhagic glaucoma. Complicated glaucoma is the name applied to cases of glaucoma that exist at the same time as some other disease of the eye, which does not have an etiological bearing on the glaucoma. Such diseases are cataract, optic atrophy and myopia.

Buphthalmos is known as congenital glaucoma. The term is also applied to glaucoma occurring in childhood. There not

only is increased tension and cupping of the optic disk but also enlargement and deformity of the eyeball. The cornea may be clear or opaque and is very thin. The pupil is dilated and the lens remains small. The sclera of the eye in the infant is more yielding than in the adult, which accounts for the enlargement and deformity.

Cataract

Definition.—A general term embracing any opacity of the crystalline lens or its capsule. A capsular cataract is a thickening or hyperplasia of the capsule of the lens, causing it to be opaque. This may be congenital, primary, or secondary. A capsulolenticular cataract is the name applied to a form in which there is opacity of the lens and capsule.

Adjustment.—Upper cervical with K. P.

Pathology.—Any condition which interferes with the nutrition or osmotic action of fluids in the anterior part of the eyeball or inflammatory conditions of the lens or structures near the lens are capable of producing cataract. The changes occurring in the lens are slow and progressive. At first there is a slight contraction of the fibers of the lens which is followed by atrophy and the formation of irregular interspaces which are filled with large quantities of fluid. Finally the lenticular fibers show cloudiness, transverse striations, fat globules, cholesterin, pigmentation, and other signs of degeneration.

Symptoms.—In the early stages the principal subjective symptom in all forms of cataract is the gradual but steady loss of vision. In those cases where the periphery of the lens is first affected by the opacity, vision may remain good until late in the disease. Such an opacity is called cortical cataract. If the opacity begins near the center of the lens, it is called a nuclear cataract and interferes with vision in its earliest stages. In almost all cases there are floating specks, diplopia, and alterations in refraction. These are all due to the irregular swelling

of the lens substance, which may be so great at times as to produce myopia, which is commonly called the second sight in old age. Among the objective symptoms will be found swelling and bulging of the lens, which presses upon the iris and thus narrows the anterior chamber; photophobia; and a discolored pupil, which may be brown, yellow, or white. This latter symptom, however, may be absent.

In the **first stage** the opacities are scattered throughout the lens in the shape of spots or lines, which radiate toward the center, leaving spaces between them that are still transparent. In the **second stage**, which is called the stage of swelling, the lens has absorbed more fluid and because of this enlargement has pushed the iris forward, reducing the depth of the anterior chamber. In this stage opacity becomes complete, and the lens has a bluish-white color. In the **third stage**, which is also called the stage of maturity, contraction takes place and the absorbed fluid is pressed out. The anterior chamber then resumes its normal depth, and the iris becomes dull gray or brown in color.

The **process of ripening** requires from a few months to several years, but the usual time is from one to four years. When the entire substance of the lens has become opaque, when the swelling has subsided, and the anterior chamber has resumed its normal depth; the cataract is said to be ripe. This may be determined by illuminating the pupil and carefully observing if a shadow of the margin of the iris is reflected from the lens. If no shadow exists, the opacity is complete; but if a shadow is present, there is still a transparent reflecting layer of the lens beneath the capsule.

Congenital or **juvenile** cataract is a rare occurrence and consists of localized opacities in certain layers of the lens between which are clear spaces. Little but a gray blur can be detected by close inspection. Ophthalmoscopic examination reveals a sharply outlined opacity, which is surrounded by a reddish circle due to reflection from the fundus. There are usually constitutional disturbances, among which are syphilis, rachitis,

and tuberculosis. About eighty per cent of these cases have some diseases having convulsions.

Traumatic cataract results from laceration of the capsule of the lens, and its progress is dependent upon the amount of surface exposed to the torn capsule. If the anterior capsule is torn, the aqueous humor is absorbed; and if the posterior capsule is torn, part of the vitreous humor is absorbed, causing the lens to swell, become disorganized and opaque. If the cataract develops following a blow on the head or side of the face or from an explosion, it is termed a concussion cataract.

Complicated cataract may result from disease in almost any part of the eye and is produced by an extension of the inflammatory changes to the lens.

Senile or hard cataract is also called gray or simple cataract and usually develops after the forty-fifth year. The cataract may remain stationary, or it may ripen completely in a few months, or there may be times that it ripens rapidly and other times that it progresses slowly in the same case. Both eyes are nearly always affected but one considerably in advance of the other. The central layers of the lens are normally more dense than the superficial layers and are called the nucleus, while the softer surrounding mass is called the cortex. This difference is more pronounced after the thirty-fifth year. When the condition of hardening and staining continues at a more rapid rate, the center becomes opaque and is called a nuclear cataract. It is rare, however, that the cortex is not involved in this process of hardening and opacity; and when such is the case, it is called a cortical cataract. It begins and progresses as previously described.

Secondary cataract includes three varieites, as follows: **Anterior polar** or pyramidal cataract, which usually results from a central perforating ulcer of the cornea and appears as a conical mass projecting forward from the surface of the lens. It is white in color and visible through the pupil. **Posterior polar** cataract usually results from disseminated choro-

iditis. It manifests itself as a star-shaped opacity in the lens, with or without opacity in the vitreous body. It is always associated with a high degree of myopia. **After-cataract** is a condition left or resulting from an operation for cataract. The changes occur in the capsule and result from a proliferation of its connective tissue or from a plastic exudate, which occludes the pupil.

Diabetic and **albuminuric** cataract are forms developing in individuals suffering with these diseases. They are largely dependent for their existence upon diabetes and nephritis and are often associated with retinitis due to the same disease. Many of these cases make very good recoveries under adjustments for these respective diseases.

Hyalitis

Definition.—Inflammation of the vitreous humor which may be suppurative or characterized by the presence of floating opacities in the vitreous humor.

Adjustment.—Upper cervical with K. P.

Symptoms.—As the vitreous humor has no blood vessels, the signs of inflammation are limited to the adjacent structures and their exudate is forced into the vitreous humor. Most cases are secondary to inflammatory conditions of the choroid, ciliary body, retina, or lens; consequently the symptoms of the primary condition are always present. When pus forms in the vitreous humor, it is in a circumscribed mass and can be seen with the ophthalmoscope. It is attended by fever, pain over the eye, loss of sight, and finally atrophy of the eyeball. Previous to the loss of vision there is a scotoma in the visual field which corresponds to the opacity in the vitreous humor.

Opacities of the Vitreous

Definition.—Any movable or fixed opacity in the vitreous humor, which causes dark spots or areas in the field of vision.

Adjustment.—Usually upper cervical with K. P., but lumbar with Li. P. subluxations will cause opacities.

Symptoms.—These opacities can be seen by the patient as black spots or areas, which may be movable or fixed. The patient is able to describe their size, shape, and position. When the opacities are very small, there may be no interference with vision; but when large and fixed there may be great interference with vision. If pain is present it is quite certain that the opacity is secondary to inflammation in some part of the eye. The ophthalmoscope shows the positive existence of these opacities. Under this inspection it will be seen that when the patient moves the eyeball toward the right the opacity moves toward the left. In this way opacities of the vitreous can be distinguished from those of the lens or cornea, which are fixed and move with the movements of the eyeball. A patient may have temporary dark spots before the eyes, resulting from a neurosis of the retina or optic nerve and not from opacities in the vitreous.

Embolism of the Retinal Artery

Embolism of the central artery of the retina most commonly occurs in valvular disease of the heart, arteritis, nephritis, and arteriosclerosis; consequently the adjustment depends upon the condition to which the embolism is secondary as well as the local zone. Upper cervical and K. P. should be included in every case.

Pathology.—The embolus may consist of endothelium which has sloughed from the inner lining of the blood vessels or heart. It may be granular in nature or may consist of a hyalin plug. The lumen of the vessel may be partially or completely occluded. After the obstruction has taken place, the retina, optic nerve, and chorid undergo atrophy. The embolus does not always block the central artery itself but may lodge in one of its branches, in which case the atrophic changes are limited to a small area and may disappear as the collateral circulation is established. In this latter type of cases the vision may remain normal or be but slightly affected.

Symptoms.—The onset is sudden with complete loss of vision, without any pain, or without other sensory disturbance. When affecting one eye, and this is usually the case, the patient may remain entirely ignorant of his blindness for a considerable time. In other cases the patient may see sudden flashes of light or a few dark rings as vision hastily departs. The ophthalmoscope shows a marked ischemia of the retina. The arteries and corresponding veins are small and contain broken cylinders of blood, separated by clear spaces, which can be seen moving sluggishly along. The retina is pale and the optic nerve is nearly white. This contrast is obvious when comparing it with the unaffected eye. A characteristic feature of the disease is that the macula stands out prominently as a cherry red spot, even though the rest of the retina is pale. In the course of several weeks cases having complete obstruction show a decrease in the retinal edema, atrophy of the optic disk, and white lines marking the course of the functionless vessels.

Thrombosis of the retinal artery may occur under the same circumstances as embolism and may form in the main artery or one of its branches. The symptoms and appearance of the retina are the same as described with the exception that they develop gradually.

Thrombosis of the Retinal Vein

Adjustment.—Upper cervical with K. P.

Symptoms.—When thrombosis affects small veins, the symptoms consist of a number of insensitive spots on the retina, which produce blind spots in the field of vision. These correspond in size, shape, and location to the part affected by the thrombus. Complete thrombosis of the central vein causes great engorgement of the retina, with venous pulse and numerous retinal hemorrhages. In cases of short standing, where the vitreous is still clear, the condition can be readily recognized with the ophthalmoscope; but in time the vitreous

humor becomes opaque from absorption of the soluble constituents of the blood.

Simple or Serous Retinitis

Definition.—An inflammation of the superficial layers of the retina.

Adjustment.—Upper cervical with K. P.

Pathology.—In the early stages the principal alteration consists of hyperemia of the retinal vessels with edema and some infiltration of leukocytes into the inner layers of the retina. When becoming chronic there is an overgrowth of connective tissue and atrophy of the retina.

Symptoms.—Ophthalmoscopic examination shows three prominent and characteristic objective symptoms, which are: **First,** edema of the retina. The retina appears as seen through a mist and has a grayish color; the vitreous may be cloudy from the infiltrated serum. **Second,** the veins are altered, being distended at some points and covered by the swollen retina at other points. **Third,** retinal hemorrhages may be seen, but they are small and not numerous in the simple form of the disease. The first subjective symptom to present itself is a loss of the acuteness of central vision associated with contraction of the visual field. If the inflammatory process is localized in a small part of the retina, the scotoma will be small and situated in a corresponding part of the field of vision. There is a marked distortion of vision due to the swollen retina having changed its position. This makes objects look larger or smaller than normal, according to the changes that have taken place. An occasional symptom is the ability to see better by a poor light than by a bright light, and as a rule these cases can see better in the evening after sundown than during the day. Pain is seldom present even though there may be a high degree of inflammation.

Retinitis due to concussion and to syphilis presents the same symptoms, but the history of the case is usually sufficient

to indicate whether either condition is an etiologic factor of the retinitis.

Macular retinitis is a term applied to any inflammation of the retina which is localized in the macular region.

Parenchymatous Retinitis

Definition.—A form of retinitis involving the deep layers.

Adjustment.—Upper cervical with K. P.

Pathology.—This form begins with hyperemia, edema, and an infiltration of white cells in the deep layers of the retina. This is followed by absorption of the products of inflammation and partial or complete atrophy of the retina with abundant overgrowth of connective tissue.

Symptoms.—The arteries are found to be distended with blood, and the optic nerve is a deeper red than normal. The veins are also overfilled and occasionally have minor hemorrhages into the adjacent structures. These hemorrhages are especially common in retinitis of nephritic origin, and hemorrhages appear as small red spots. When the hemorrhage is large, it is most commonly linear in shape and is called hemorrhagic retinitis. There is dullness of vision, increasing at a rather rapid degree; this may result in total blindness if the inflammation is general. If the inflammation is circumscribed, there is a scotoma in the corresponding part of the field of vision. Pain is absent, but there is distortion of objects. If but one eye is affected, the condition may be far advanced before detected. This form of retinitis may begin as the serous type, or the two forms of the disease may coexist in different parts of the retina.

Nephritic Retinitis

Definition.—A general term which includes all changes in the retina directly dependent upon some disease of the kidney.

Adjustment.—K. P. is the most important adjustment, but upper cervical should be included.

Pathology.—The retina becomes hyperemic and edematous. the connective tissue in the deep layers undergoes hyperplasia and finally fatty degeneration, after which the retina may be the site of numerous hemorrhages.

Symptoms.—**In albuminuric retinitis** the patient first complains of imperfect vision, which progressively increases. The macula is often the last part of the retina to become affected. This preserves central vision late in the disease. Both eyes are usually involved to about the same degree. If the case is unilateral it soon becomes bilateral. The ophthalmoscope shows fatty deposits in the posterior part of the retina. These spots are very small and have the appearance of minute dots, which are arranged in the form of a circle around the macula. In the macula itself there is usually one or more of these white spots, from which radiate a number of thin, white, glistening lines. These two signs are considered as the ophthalmoscopic picture of the disease and sufficient to recognize it. Retinal hemorrhages may occur and are usually long or linear in shape, very rarely being dotted or sheet-like. They are due to changes in the arterial walls. The optic nerve is swollen and streaked with enlarged vessels.

The prognosis in cases due to pregnancy is good, but those due to nephritis and arteriosclerosis are less favorable, as statistics show that sitxty-two per cent of such cases die within the first year and ninety-three per cent within the first two years.

Diabetic retinitis has the same structural changes as the albuminuric form. The retina after being inflamed undergoes fatty degeneration. The subjective symptoms relating to the eye are the same in all forms of retinitis, but the constitutional symptoms in this form are those of diabetes. Examination of the eye in diabetic retinitis shows no lines radiating from the macula and hemorrhages are much less common.

Retinal Hemorrhage

Definition.—An effusion of blood from the retinal vessels. This is also called **apoplexy of the retina.**

Adjustment.—Upper cervical with K. P.

Pathology.—Hemorrhages may occur in connection with retinitis, and the condition is then spoken of as hemorrhagic retinitis. However, the condition called retinal hemorrhage more commonly occurs because of changes taking place in the vessel walls. The changes may be those of fatty degeneration, arteriosclerosis, venous obstruction, or vasomotor weakness. The hemorrhages may take place in any layer of the retina; but when superficial they leave the retina in a healthy state and, after absorption of the effused blood, leave no visual defect. Sometimes the blood breaks through the limiting membrane and passes into the vitreous humor. The macular region is the favorite location for retinal hemorrhages.

Symptoms.—The onset is sudden and the extravasation is apt to be large when no inflammatory condition exists. The patient sees a veil or a cloud moving from above downward, which greatly interferes with vision. It is most common in the macular region, where it can be seen as an irregular or oval blotch with the long vertical diameter. There may be partial or complete blindness for two to four weeks which gradually diminishes as the blood is absorbed. If absorption is incomplete, a scotoma will exist in the field of vision. Oftentimes these hemorrhages will recur, each attack presenting the same symptoms.

Sclerosis of the Retina

Definition.—A hardening of the retina due to an overgrowth of its connective tissue.

Adjustment.—Upper cervical with K. P.

Pathology.—In the earliest stages there are signs of inflammation with proliferation of the connective tissue. This is followed by sclerosis of the retinal vessels with contraction of their diameters, atrophy of the nerve elements, and destruction of the rods and cones. In the pigmented form there are pigmentary deposits of various shapes in the retina.

Symptoms.—Night blindness is ordinarily the first symptom to attract the attention of the patient, but changes can always be observed in the retina when this symptom is present. Central vision is lost, the field of vision is contracted, and myopia is present. Often the patient is unable to recognize the red and green colors. The optic disk is red or gray in color or may have a glistening tendon-like whiteness. When pigmented dark spots or areas are seen, especially along the temporal side of the fundus. The pigment is arranged in a peculiar manner, making that part of the retina affected appear to be studded with haversian canals, which gives it a star-like appearance.

Detachment of the Retina

Definition.—A condition in which the retina and choroid become separated, the former floating in the vitreous humor.

Adjustment.—Upper cervical and K. P.

Pathology.—It may be produced by a stretching of the sclersclera and choroid, they being drawn away from the retina; the retina may be pushed from the choroid into the vitreous humor by a tumor or an accumulation of fluid, which may have exuded from the choroid during the process of inflammation; or it may be drawn from the choroid by changes occurring in the vitreous body and rupture of the retina, which permits fluid to pass in behind it.

Symptoms.—Most commonly there is a fluid behind the retina, which gives it a pale color. Its vessels can be seen plainly as they retain their position in the retina. They appear as dark cords and are smaller than normal. The border of the detachment is sharply outlined by a yellowish or pigmented line. The fluid always gravitates toward the lower portion of the globe; and even though the detachment be at the side or above, the fluid will find its way to the lowest level. Sometimes the detachments are small and have a furrowed appearance. In other cases they are almost circular in shape. The rods and cones become swollen, losing their

original structure and function. The ophthalmoscopic picture is not likely to be mistaken for anything else. The detached portion of the retina is of a grayish white color, having wavy folds, which are transversed by vessels and are readily seen in this light background. When the detachment occurs suddenly, the patient notices a dark cloud or mist which he may try to push away. This is the scotoma corresponding to the detachment. The lines on a page appear to be zigzag, widely separated and arranged in a wave-like form.

Papillitis

Definition.—An inflammation of the optic disk or that part of the optic nerve within the eyeball. It is also called **intraocular neuritis.**

Adjustment.—Upper cervical and K. P.

Pathology.—This is known is a choked disk and presents the signs of simple inflammation, followed by proliferation of connective tissue, sometimes hemorrhage, and finally optic atrophy.

Symptoms.—The optic disk is swollen and raised above the surface of the retina; the larger vessels are readily visible, the veins being slightly distended and the arteries often decreased in size. Small patches of exudate and hemorrhage may be seen in the adjacent retina. The condition of the optic disk may undergo but very little change for a year or more, after which time a condition of optic atrophy supervenes. Vision may vary from normal to complete blindness. If the acuteness of vision varies greatly without any change in the appearance of the disk, it indicates that the disturbance is due to intracranial lesions. When vision is good with a choked disk, it is of short duration and may be explained by the fact that adaptation may take place so long as the structure of the nerve is not destroyed. The patient may have a scotoma in the field of vision, which is always contracted. Some patients are devoid of the color sense and complain of flashes of light or other subjective symptoms.

Optic Atrophy

Definition.—This is the term applied to the disappearance of a large or small number of fibers of the optic nerve which have become pale and overgrown with connective tissue.

Adjustment.—Upper cervical.

Pathology.—The structural changes are those of a chronic neuritis, which terminates with proliferation of connective tissue and atrophy of the compressed nerve fibers.

Symptoms.—The optic nerve becomes bluish-white or grayish-white in color with clear cut edges. The vessels often show some reduction in size; and if there has been an acute inflammation, white streaks of connective tissue can be seen along the larger blood vessels. The optic disk assumes a chalky white color. There are visual disturbances which develop very gradually. Central vision becomes poor and the field of vision contracted. Vision is gradually but progressively lost. A few cases may become stationary at any stage of the atrophy, never becoming totally blind but always having poor vision. The duration before total blindness varies from three months to about three years.

Amblyopia and Amaurosis

Definition.—**Amblyopia** means dull eye and is a term applied to dimness of vision or partial loss of sight occurring without any change in ocular structure. **Amaurosis,** which means dark eye, is a term applied to a condition of complete blindness having no pathology.

Adjustment.—These conditions are usually neuroses, and in such cases the upper cervical area should be adjusted. When they result from toxins as lead, iodine, bromine, malaria, and diabetes; the adjustment should be for normalizing the elimination in the middle and lower dorsal regions.

Symptoms.—When an eye has never taken part in the visual act to a normal degree, it is called congenital amblyopia. In such cases there is usually an early squint, although the

positive signs are not present until the child becomes old enough to notice objects both close and at a distance. Amblyopia for colors is also called color blindness. It occurs to some extent for certain colors in about three per cent of the entire population, being much more common in men, and is always bilateral. Amblyopia has been known to result when there is uremic poisoning of the visual centers in the brain without producing a retinitis. An example of this may be found in the late stages of scarlet fever—it is called uremic amblyopia. When accompanying diabetes it is called glycosuric amblyopia. Other cases have been known to occur with loss of blood, as in anæmia or hemorrhage; other cases from worms and digestive disturbances. Amblyopia and amaurosis are recognized by the fact that vision is poor or absent, and there are no signs to indicate disease of the eyes.

Eyestrain

Definition.—A condition developed by prolonged effort on the part of the accommodating apparatus of the eye.

Adjustment.—Upper cervical.

Symptoms.—When the ciliary muscle becomes tired from prolonged use of the eye at close work, looking at small objects brought near the eye, or reading while on a moving car, which causes the accommodation to rapidly change; the patient becomes affected with headache and blurring of vision, which is commonly called eyestrain. This is more especially true if the patient's eyes are hyperopic. Eyestrain is manifested by failure of near vision after use of the eyes, blurring of distant vision, dilatation of the retinal vessels, redness and swelling of the optic nerve, and congestion of the conjunctiva. There is always headache, which may be confined to the region over or behind the eyes or may become general over the entire head. This headache may be limited to one side of the head and as a rule is aggravated upon use of the eyes. Patients having eyestrain complain of being nervous and as a rule are very irritable, peevish, and emotional.

Hyperopia

Definition.—Hyperopia is an error in refraction, which occurs when the retina is situated in front of the principal focus.

Adjustment.—Upper cervical.

Symptoms.—As the hyperopic eye must use some accommodation at all times, it is deprived of the periods of rest that the normal eye has when fixed on distant objects. Gradually this overwork over a period of time reduces the power of accommodation permanently. Although at birth nearly all eyes are hyperopic, that disappears until the twenty-fifth year at which time the lens begins to enlarge. The enlargement of the lens continues until the sixty-fifth year, during which time the lens is said to have increased one-third in size. This enlargement would naturally produce a slight degree of hyperopia during that period; but since the hyperopia would be corrected by accommodation, only the highest degrees would produce symptoms. The earliest sign is a convergent squint and poor vision, with a tendency to hold the printed page close to the eye as in myopia. When the condition is not corrected, the individual becomes affected with eyestrain. Farsightedness can only be detected by the proper eye tests.

Myopia

Definition.—Myopia or near-sightedness is a condition in which the rays of light are brought to a focus in front of the retina.

Adjustment.—Upper cervical.

Symptoms.—High degrees of myopia are much more common than hyperopia. In myopia all objects situated beyond the far point of the eye are indistinct. This indistinctness can be removed or lessened by moving the object closer to the eye, by looking through a concave lens or through a pin hole opening in a card. Objectively the myopic eye appears large and elongated. This change in its shape may be due to a con-

genital deformity of the eyeball, but most cases result from some pathological condition of the eye. Weakness of the sclera and an increase in the intra-ocular tension are especially apt to bring about this deformity. Myopia is recognized by the proper eye tests.

Astigmatism

Definition.—It is a defect in which the rays of light from a single point do not, after refraction, meet at a single point.

Adjustment.—Upper cervical.

Symptoms.—Generally lines can be seen clearly only when they run in some one direction, and this direction is that of one of the principal meridians. When the patient observes a number of lines running in different directions, some of them appear very indistinct. It will be found that these indistinct lines lie in the meridian involved. This blurring may be overcome for short intervals by the accommodative action of the ciliary muscles. When the astigmatism exists alone, the blurring is not more than one-half as great as that produced by myopia or hyperopia of the same degree. *Astigmatism with the rule* is more common and occurs when the visual defect with the meridian of greatest refraction is vertical. *Astigmatism against the rule* means that the meridian of greatest refraction is horizontal or nearly so. It is much less common. Irregular astigmatism is the result of disease of the cornea in which its surface is left irregular, having depressions or elevations. This latter condition cannot be corrected by lenses or adjustments.

Presbyopia

Definition.—Presbyopia means the old eye. It is the failure of accommodation with age, which leads to inability to change the optical condition of the eye, so that only rays of a certain convergence or divergence can be focused on the retina.

Adjustment.—Upper cervical.

Symptoms.—When the eye is used in close work for an unusual time, symptoms of eyestrain develop: headache, pain in and over the eyes, and congestion of the conjunctiva. If the effort is sustained for some time, the ciliary muscles suddenly relax; and all near objects become blurred. If the eyes are then rested for a short time, the power of distinct vision again returns. Persistent near vision causes frequent failures of accommodation until in time the attempt will stop.

Strabismus

Definition.—Strabismus is more commonly known as **cross-eye** and is the inability to bring the visual axes to bear upon one point at the same time.

Adjustment.—Upper cervical is the specific adjustment, as this condition is due to involvement of the oculomotor or abducens nerves.

Symptoms.—Strabismus may affect one or both eyes and is due to paralysis of one or more of the recti muscles. If the eyeball is turned toward the external angle of the orbit, it is called **divergent** or external strabismus, a condition due to paralysis of the internal rectus muscle, which is supplied by the oculomotor nerve. When both eyes are involved by this divergent strabismus, a peculiar facial expression is produced called Hutchinson's face.

If the eyeball is turned toward the nose, it is called **convergent** or internal strabismus, a condition due to paralysis of the external rectus muscle, which is supplied by the abducens nerve. This is by far the most common form of strabismus.

Test over Reading assignment, 506-7-8-9-10-½ of 11

CHAPTER XVI

Final Exam March 18th

DISEASES OF THE SKIN
GENERAL SYMPTOMATOLOGY

It is necessary to acquire a definite understanding of the various lesions encountered in skin diseases, as it is the aggregrate of these that constitutes the objective change of those diseases and establishes the basis for their recognition.

These lesions of objective structural changes are divided into two classes; viz., primary and secondary.

Primary Lesions

Macules are variously sized and shaped areas of discoloration characterized by the absence of elevation or depression.

Papules are circumscribed, solid elevations of the skin and vary in size from that of a pinhead to that of a pea.

Vesicles are slight elevations of the skin containing a clear or opaque fluid. Their size varies as does that of a papule.

Pustules are slight elevations of the skin containing pus and are about the size of vesicles.

Blebs or **bullæ** are large elevations of the skin containing a clear or opaque fluid and vary in size from that of a pea to that of a goose egg.

Wheals or **pomphi** are circumscribed areas of cutaneous or subcutaneous edema of a temporary character.

Nodules are solid elevations of the skin of deep origin and vary in size from that of a pea to that of a cherry.

Tumors are atypical growths of various size, shape and consistency located in the deep layers of the skin.

Secondary Lesions

Crust is a dried secretion or exudate upon the skin and follows vesicles, postules, and weeping eczema.

Scale is a circumscribed thin layer of epidermal cells which have become detached and are about to be shed. Scales are light in color.

Excoriation is a scratch mark or a superficial denudation of the skin.

Fissure is a crack in the skin extending down to the corium. It is usually located in the folds of the skin over the joints.

Cicatrix is a scar or the effort of nature to heal a damage to the skin by means of connective tissue. It occurs only where the papillary layer of the skin is destroyed.

Six Dermatological Don'ts

1. Don't form an opinion from the history of the case. Note the eruption and all other symptoms, then substantiate it by the history.

2. Don't form an opinion of syphilis because of syphilitic history. People with syphilis may have other skin diseases.

3. Don't depend upon any one symptom, but let your opinion be guided by the general make-up of the disease as a whole.

4. Don't forget that many conditions of the skin are dependent upon disturbances in the general health of the patient. Therefore—

5. Don't forget to inquire into the performance of the various organs and try to put the patient in as good a physical condition as possible.

6. Don't encourage the popular notion that there is danger of an eruption "going in," for it never does under Chiropractic adjustments.

Abscess

Definition.—A collection of pus circumscribed by a pyogenic membrane and located in the subcutaneous tissue.

Adjustment.—Local in combination with K. P.

Pathology.—An abscess is usually encountered as a compli-

cation of other skin diseases such as eczema, scabies, and acne. It consists of a localized area of hyperemia and swelling into which there is an infiltration of cells which undergo decay, forming pus.

Symptoms.—Abscesses of the skin usually develop suddenly and are small in size except when on the scalp. They form round swellings which are hard or firm to the touch at first but soon become soft and fluctuate under pressure. When opened they give off a thick pus. They are most common on the scalp with eczema, on the face and back with acne, and on the extremities with scabies. They may disappear by absorption or open of their own accord. There is but slight pain and discomfort in cutaneous abscesses. Abscess differs from a boil in that it is not raised and pointed, does not have a central core, and is less firm. They differ from carbuncles by the absence of constitutional symptoms, brawny infiltration, intense inflammation, and cribiform mode of opening.

They differ from syphilitic gumma in that gumma has no pain, is dark red in color, grows slowly, is usually multiple, and when cut gives off but little bloody fluid.

Acne

Definition.—An inflammatory disease of the sebaceous glands and hair follicles; characterized by a retention of their sebum and an eruption of papules, pustules, or nodules upon the face, neck, or shoulders.

Pathology.—Acne begins in the hair follicles or sebaceous glands with hyperæmia, swelling, and thickening of connective tissue in the wall of the opening through which the sebum reaches the surface. This causes inspissation of the retained sebum and results in the formation of a papule located in the upper part of the skin. When in this stage it is called **acne papulosa.** This may be followed by proliferation of the surrounding connective tissue, the extent of which is variable, forming nodules which are sometimes called tubercles, constituting the lesions known as **acne tubercula.** Finally sup-

puration takes place in which the gland is destroyed and pus forms, occupying its site, constituting the lesion which predominates in the stage called **acne pustulosa.** When the skin lesions in acne are largely formed of connective tissue or are surrounded by great thickening of the connective tissue, making them of deep origin and nodular in size, it is called **acne indurata.**

Adjustment.—K. P. Since acne is an inflammatory disease involving tissues in many zones, it would indicate a dormant condition of lowered tissue resistance which may be irritated or injured by the presence of toxins retained within the body because of poor elimination earlier by the kidneys or bowels; therefore, it may be necessary in some cases to adjust in the lumbar region. This would be determined by the history of the case.

Symptoms.—The first stage in all cases of acne is known as **acne vulgaris** or acne simplex. It is characterized by the appearance of pinhead or pea-size papules which are flat or slightly pointed and situated about the hair follicles. These papules are usually red in color but may have a dark or black center. They may first appear on any part of the body but most commonly on the face, neck, or shoulders. A few postules may appear early; but as long as papules predominate, it is called papular acne. The pustules have a red base with a yellow center and are the same size and shape as the papules. There is no pain. Some of the papules slowly undergo resolution without the formation of pustules. Other papules undergo a slow transformation forming pustules which remain as such for many days or weeks. The adjacent skin is usually greasy and has large pores, some of which are occupied by comedones. Occasionally two or more pustules may coalesce and form cutaneous abscesses. There is much induration around these abscesses, leaving an elevated scar.

Acne indurata is a form of pustular acne in which the pustules are large and deep-seated, being surrounded by an abundance of connective tissue. Cutaneous abscesses are more

common in indurata than in acne vulgaris. After the disappearance of the eruption acne may leave the skin the site of many deep scars, which is called acne atrophica; or acne hypertrophica if the scar has a decidedly raised margin.

Acne artificialis is the result of large doses of bromides, iodides, and tar products. Its papules and pustules are the same as previously described. The history of such a case would show the use of some of these drugs. When use of the drug ceases, the eruption disappears.

Acne frontalis is applied to cases in which the lesions are confined to the forehead along the hair-line. Its papules are very small and leave brownish red scars. The course in these cases is usually very chronic.

Differential Symptoms.—True acne differs from acne rosacea in that the latter is confined to the middle third of the face and has few papules but great redness and thickening of the skin.

Acne differs from papular eczema in that the latter may be found in patients of all ages, does not occur in the face alone, is often found upon the extremities alone, has no comedones, and usually has excoriations.

Acne differs from pustular eczema in that the latter is usually found in children, while acne is rarely found before puberty. The pustules are many, they coalesce, form green crusts, and run an acute course.

True acne differs from syphilitic acne in that the latter is general in its distribution and always has other evidences, such as the scar of the initial lesion, enlarged lymphatics, uniform lesions, mucous patches, a few months' duration, and small white scars.

Acne Rosacea

Definition.—A chronic, inflammatory affection of the nose and cheeks characterized by engorgement of the blood vessels, hypertrophy of the skin, and acne-like eruptions.

Pathology.—Acne rosacea begins with hyperæmia and stasis in the capillaries which is followed by hypertrophy of the capillary walls, interrupting the circulation, and by inflammation of the sebaceous glands forming papules and pustules. This constitutes the principal change occurring in typical cases, but occasionally the process progresses with hyperplasia of the connective tissue, which greatly deforms the nose. This deformity is called rhinophyma.

Adjustment.—Middle cervical and K. P.

Symptoms.—The onset is slow and insidious with diffuse redness of the nose, which is increased upon exposure to the cold. This redness is often transient. The skin of the nose is usually greasy and cold. Later the capillaries become dilated and are plainly visible. Papules develop and many gradually merge into pustules; but these are always few in number. The skin becomes hypertrophied, resulting in dark red, bulky formations, deforming the nose. The latter stage is fortunately rare.

Bromhidrosis

Definition.—A condition in which the sweat has an abnormal but distinctive odor.

Adjustment.—When primary, K. P. is the adjustment. When symptomatic, such as in hysteria, adjust for the disease of which it is symptomatic.

Symptoms.—Bromhidrosis is usually associated with hyperhidrosis and often is limited to the feet and axilla but may be general. The odor is not always offensive, as cases have been reported having the odor of some flower or drug. Fever has a peculiar odor that could be classed as bromhidrosis. This is pronounced in measles. When localized the affected parts are usually of a pinkish color, may be tender, and become sore easily. The odor is due to decomposition of the fatty acids in the sweat.

Chromhidrosis is sweat having an abnormal color and may be associated with both bromhidrosis and hyperhidrosis. It is

usually localized in limited regions, predominates in women, and may result from the use of drugs. The colors may be yellow, green, red, blue, or purple.

Carbuncles

Definition.—A suppurative inflammation of the subcutaneous tissue involving several hair follicles or sebaceous glands.

Pathology.—A carbuncle begins with localized hyperæmia and swelling of the skin. The sebaceous glands involved are converted into retention cysts. Their contents suppurate, and they perforate the skin, forming sieve-like openings.

Adjustment.—Local and K. P.

Symptoms.—A carbuncle begins with a papule, which within twenty-four hours becomes large, very painful, and slightly raised, having an indurated, brawny base. Constitutional disturbances consisting of malaise, fatigue, loss of appetite, headache, and rise in temperature develop and persist until the pus is discharged. The pain becomes very severe and is of a throbbing or lancinating character. In ten days the swelling has reached its height. It is then very firm to the touch and may be as much as two or three inches in diameter at the base. The process of softening is marked by several pea-size purulent points, which finally break discharging pus, and from which the core or destroyed gland finally sloughs. These openings may unite to form an ulcer; and as the ulcer deepens, the whole mass may fall out, leaving a scar upon healing.

A carbuncle differs from a boil by having a brawny base, greater pain, constitutional disturbances, multiple sieve-like openings, and longer duration.

Chloasma

Definition.—A discoloration of the skin characterized by a yellowish-brown pigmentation of various size and shape. It is also commonly called **liver spots** and **moth.**

Adjustment.—Usually K. P.; but if symptomatic, the adjustment should include local for the condition to which it is symptomatic.

Pathology.—This is considered to be a trophic neurosis of the skin, resulting in increased deposit of normal pigment in localized areas of the mucous layer of the epidermis.

Symptoms.—Chloasma is considered as being idiopathic or symptomatic but would be better considered as primary and secondary. The symptomatic variety is secondary to the disease of which it is a symptom. We have good examples of this in cancer, syphilis, cirrhosis of the liver, malaria, and Addison's disease. The primary form may follow irritations of the skin produced by blisters, plasters, scratching, or exposure to the sun's rays or wind. The spots are usually yellow or brown in color; they vary in size from a small coin to almost universal discoloration. Spots have irregular outlines, cannot be washed off, and have no roughness which can be detected by palpation.

Chloasma uterinum is a discoloration occurring in females between the ages of twenty-five and fifty. It is often seen during pregnancy and in diseases of the uterus causing irritation. The spots have brownish discoloration and may occur over the forehead, temples, cheeks, or around the mouth and more rarely on the abdomen and thorax. Occasionally it is associated with leukoderma or patches of white skin in which the normal pigment is deficient or absent. Chloasma can readily be differentiated from diseases simulating it in that they can either be washed off or scraped off or leave the skin with a harsh, rough appearance.

Clavus or Corn

Definition.—A corn is a hyperplasia of the corneum layer of the skin having a central core that grows downward into the corium.

Adjustment.—Often this is caused by wearing poorly fitting shoes, which cramp the toes, thus subluxating the first

phalanx. Corns can be relieved by adjustment of this articulation.

Symptoms. Corns occur upon the toes most commonly and differ from callouses in having a central core that grows down toward the corium. Hard corns grow on the joints, while soft corns grow between or under the toes, where they are kept moist by perspiration. They may become more painful during wet weather on account of being hygroscopic.

A **bunion** may result from an outward displacement of the first phalanx of the great toe, which produces a periostitis with hyperplasia and finally exostosis of the metatarsal bones. The pressure that then results between the exostosis and shoe give rise to an inflamed bursa, which constitutes the bunion. This may be relieved by adjusting the first metatarsophalangeal articulation.

Chromophytosis

Definition.—A disease of the skin characterized by brownish, variously shaped and sized patches occurring upon the surface of the chest or other portions of the body.

Adjustment.—K. P.

Symptoms.—This is also called tinea versicolor and occurs most commonly between the twentieth and fortieth year. It results from a vegetable parasite called the Microsporon furfur, which does not grow on all skins but seems to flourish best where the skin is sweaty. It begins with small yellowish or brown spots, many of which may coalesce to form large patches. These patches are round at first but as they get larger become irregular in shape. The edge of the patch is always definitely marked. When the skin is warm, the brown patch presents a pinkish hue; and this is also true after bathing or scraping the skin. At times the patch is dry and scaly, and at other times it is smooth and greasy. The sternum is the most common location; but the discoloration may extend to the back, shoulders, and arms. The number of patches may

vary from a few to hundreds, and they are not symmetrical. Subjective symptoms are usually absent, but there may be slight itching when the skin is sweaty or the patch has been recently irritated.

Dermatitis

Definition.—Dermatitis is an inflammation of the skin.

Adjustment.—The adjustment is to be determined by the character of the case. If it is a simple localized inflammation resulting from a local irritation, the adjustment would be local in the zone affected. If it is localized but the result of a toxic condition, K. P. would be important; while if it is associated with high fever and general in its character, C. P. and K. P. should be adjusted.

Pathology.—The structural changes in all forms of dermatitis are those of simple inflammation; that is, hyperæmia, swelling, sometimes suppuration, and desquamation varying in degree and extent.

Symptoms.—I. **Dermatitis exfoliativa** is a form involving the whole cutaneous surface and is characterized by redness, dryness, and abundant desquamation. It begins with erythematous patches in the folds of the skin. These gradually enlarge until by the third day the entire surface has become red. In rare cases one month may be required before its height is reached. The palms and soles are the last parts to be involved. The skin is dry and bright red at first; but during the second week the redness lessens, the skin becomes scaly, and desquamation begins. This desquamation is extremely abundant in some instances, the epidermis falling off in large sheets. In other instances the body may be covered with large thin scales having upturned edges. The hair and nails are sometimes shed. The mucous membranes may become inflamed and have increased secretion. At the onset of the disease there may be high fever of the continued type; but later in the disease the fever becomes intermittent, being present at night only. There are usually some sensory disturbances con-

sisting of chilliness, stinging, tingling, burning, tenderness, and pain but not itching. The secretion of the sweat and sebum is suppressed. The condition may become chronic with great emaciation and be fatal.

II. When this disease appears in the newborn, it is called **dermatitis exfoliativa neonatorum.** In this class of cases there is no fever or digestive disturbance. It begins with erythema around the mouth, which soon spreads to the trunk and extremities. Desquamation is profuse, occurring in large folds and leaving the skin dry and sensitive. This form usually starts between the second and fifth week of life and lasts seven or eight days. The prognosis is favorable.

III. **Dermatitis herpetiformis** is a form of the disease in which there is a diffuse herpetic eruption. It begins with prodromal symptoms of malaise, constipation, sensations of heat and cold, and slight fever. Itching of the skin precedes the outbreak of the eruption, which may be localized or diffuse. The eruption may be erythematous, vesicular, papular, bullous, pustular, or a combination of two or more of these, multiformity being characteristic. The lesions may be bright red at first but darken with age. When vesicles predominate, they are found in clusters, each being the size of a pinhead or pea. When several of these vesicles coalesce, they form a bleb or bulla, which may vary in size and shape. The vesicles do not rupture unless injured, this being one of the important distinguishing symptoms from vesicular eczema. When vesicles predominate, the disease is called **dermatitis herpetiformis vesiculosa** and is regarded as being the most common variety. When bulla predominate, it is spoken of as the **bullous** variety. When papules predominate, it is spoken of as the **papular** variety; and when pustules predominate, it is called the **pustular** variety.

It is well to remember that erythematous patches with grouped vesicles, papules, pustules, and bulla, intensely pruritic, and numerous excoriations always point toward this disease.

* Poison ivy, oak or sumach — upon being exposed, wash immediately with strong laundry soap, then alcohol, then if area localized use Burrows solution. If area is wide spread don't use solution.

This form of dermatitis differs from vesicular eczema by having larger vessels which are grouped in clusters upon a red base and which do not rupture spontaneously leaving a moist surface. Itching is more intense, and the duration of the vesicles is much longer.

IV. **Dermatitis from the roentgen ray** is commonly called X-ray burn. It appears weeks or days after the exposure in the form of an erythematous patch having slight swelling. Mild cases may undergo no further change and recover. Severe cases have a deep-seated severe pain with numerous vesicles or bulla upon the red patch which becomes purple. The center of the patch becomes moist, ulcerates, and does not heal readily. The hair and nails will be temporarily shed, and there may be areas of chloasma. The history of the case would show exposture to the X-ray, and the patient may have scars from previously healed burns.

V. **Dermatitis venenata** is a form of the disease resulting from the introduction of a vegetable poison into the skin. The most common form is called **Rhus poisoning** which embraces the eruptions encountered from poison sumach, poison ivy, and poison oak. The mildest cases show a marked erythema with intense itching; but the ordinary case is accompanied by considerable swelling, which may occur in the form of a wheal with burning pain. Within a few hours papules, vesicles, or bulla develop. The swelling may be intense so that when affecting the face the eyes may be completely closed. The vesicles are usually present in a countless multitude; and their contents may either dry up or be discharged upon the skin, where they dry and form crusts. The redness and swelling slowly disappear as crusts form, and the skin soon becomes normal. There is but a small percentage of people who are injured by the poison from these plants.

Dermatitis venenata differs from eczema in that it more often affects all surfaces of the fingers, hands, and face by having great swelling, more acute onset, greater number of crowded vesicles; and its occasional occurrence in streaks which is suggestive of striking against the plant.

VI. **Dermatitis calorica** is the name applied to inflammation of the skin produced by burns or frostbite. When due to the former it may be the effect of natural heat and is called sunburn, the damage to the skin being slight; but when burns are more severe, they are characterized by not only hyperemia but also large vesicles or bulla; and when there is complete destruction of the skin as by scalding, it is followed by gangrene and sloughing. Burns that involve one-half of the cutaneous surface are generally fatal. When dermatitis results from frostbite, it may be slight as is commonly seen in the condition called chilblain, which is accompanied by a sensation of heat, smarting, or burning, all of which are aggravated by dampness and cold. In the more severe cases the tissue may be destroyed and slough as the result of gangrene. The structural changes due to extreme cold are the same as those due to extreme heat.

Dermatitis is said to be traumatic when due to injury and is spoken of as medicamentosa when due to drugs. The history of these cases is usually sufficient to arrive at a correct conclusion.

Eczema

Definition.—Eczema is an inflammation of the skin characterized by any or all of its results, at once or in succession, such as erythema, papules, vesicles, or pustules, terminating in a serous discharge with the formation of crusts or in desquamation. It is also called **salt rheum, tetter,** and **scall.**

Adjustment.—K. P. Occasionally Li. P. or Spl. P.

Pathology.—The structural changes begin with hyperemia and swelling of the skin from which there is a serous exudate. If the exudate is profuse and the skin resistant, vesicles form; if the vesicles contain cells, they undergo suppuration forming pus, which transforms the vesicle into a pustule. If the serous exudate is scanty and does not break through the epidermis, dry scales form, constituting the condition called eczema squamosum. If upon removal of the crusts the corium is exposed,

it is called eczema rubrum. In the chronic form the skin becomes thickened and hardened from the overgrowth of connective tissue. It is called eczema sclerosum.

Symptoms.—Eczema is the most common of all skin diseases; and its most prominent symptoms are redness, itching, infiltration, tendency to moisture, crusting, or scaling, and cracking of the skin. Four or more of the above symptoms are found in all cases, and as a rule the disease tends to form in patches which may be localized or general. When general it is called eczema universalis. No form is clear cut and unchangeable but gradually merges from one stage into another constituting the various forms.

Eczema erythematosum begins as a enlarging macule, having an irregular outline, red in color and situated upon the face. It may spread to cover the entire face, or several similar spots may form which finally unite. Swelling which may be slight or very great is always present. There is intense itching and burning together with other sensory disturbances, the most annoying of which is the feeling of stiffness. In the beginning the macule is bright red but it darkens with age. This type of eczema is always dry, except when two surfaces come in contact where they are kept moist. In the course of a few days or weeks the affected area becomes covered with dry scales, from which it obtains the name **eczema squamosum.**

Eczema papulosum begins with round pinhead-size papules which are red in color and very numerous. They may be discrete or confluent and intermingled with vesicles. Itching and burning are very intense, and the skin may be covered with excoriations due to scratching. When the vesicles break, the discharged serum dries upon the skin, forming crusts which are usually yellowish or brown in color. When blood is intermingled with the serum, they are black in color. The exterior surfaces of the arms and legs are the favorite locations.

Eczema vesiculosum begins with burning pain, redness, and swelling which is followed by the development of a multitude

of minute vesicles, that may be discrete or confluent. The vesicles rupture of their own accord, causing a moist surface which upon drying forms a yellowish crust. New crops of vesicles form and undergo similar changes until ultimately the affected portion of the skin is completely covered by the crust. Upon removal of the crust the corium, which is a bright red color, is exposed; and the condition is then referred to as **eczema rubrum.** This is the most common of all forms of eczema, both in children and adults. It has no favorite location except in children, where it is most commonly found upon the cheeks.

Eczema pustulosum begins in the same manner as the vesicular form with numerous small vesicles which are transformed into pustules. The pustules break down rapidly, forming greenish crusts. These lesions occur in patches which may or may not coalesce. Itching is present to a less extent than in the previous forms of eczema. It is common upon the face and scalp of children.

Eczema squamosum is a clinical variety often constituting the terminal stage of erythematous, papular, vesicular, and pustular eczema. It is characterized by flat, thin, paperlike scales. The skin may be thickened and occasionally fissured. It is usually chronic and may remain in this stage indefinitely.

Eczema rubrum is also a clinical variety which results from vesicular and pustular eczema. At some time during its development the skin is covered with a thick yellowish-green crust, which upon removal exposes a bright red tender skin that bleeds easily. This red surface may again become covered with a crust as before. When the skin is covered with moisture in this stage, it is often called **weeping eczema.** When the surface becomes dry, it is soon covered with thin scales constituting squamous eczema.

Infantile eczema is most commonly the pustular form, and in its earlier stages it is often called milk crust. It begins with a crust formed of sebum, epithelial debris, and pus. When the

crust is raised, the scalp is found to be red, thickened, and moist with a purulent secretion. There are moist spots behind the ears with a red eruption. It next involves the skin of the face, which begins as vesicular eczema with much moisture and crusting. The crusts are of irregular thickness and beneath them the skin is very red. A narrow margin of skin around the eyes and mouth is free from the eruption.

Seborrheal eczema is a form of eczema occurring in the scalp of adults and constitutes one of the forms of dandruff. The onset is insidious for months or years with scaliness, itching, and gradual loss of hair. Scales mix with the sebum to form fatty crusts which are easily removed. It may gradually spread to other parts of the body but is usually confined to the head. When eczema is limited to any one part of the body, it is often given a name indicating the part affected, such as eczema **capitis** when on the scalp; eczema **palpebrarum** when affecting the eyelids; eczema **manus** when affecting the hands, or eczema **intertrigo** when occurring in folds of the skin where two surfaces come in contact. These names do not suggest a difference in type of the disease present but merely indicate the location.

Elephantiasis

Definition.—It is a hyperplasia of the skin and subcutaneous connective tissue in which there is obstruction of the lymphatics. It is characterized by enormous enlargement of the part affected. It is also called **Barbados leg, tropical big leg,** and **lymphœdema.**

Pathology.—This is produced by obstruction of the lymphatics from chronic inflammation, growth, thrombi, or inflammatory swelling and is attended by congestion, swelling, and proliferation of the connective tissues in muscles, vessels, nerves, lymphatics, and skin.

Adjustment.—Local and K. P.

Symptoms.—This may begin suddenly with fever or gradually with an erysipelas-like swelling. The rise in tempera-

ture is called elephantoid fever and is accompanied by lumbar pain, nausea, vomiting, and sweating. Most sporadic cases begin without fever but with signs of local inflammation in the deep layers of the skin, veins, or lymphatics as is evidenced by the redness and swelling. There is a milky exudate that exudes from the skin and may be accompanied by eruption of vesicles containing lymph. In time the acute symptoms will disappear, but the leg does not return to its normal size.

In the early stages there is pitting of the skin on pressure. There may be one or more recurrent attacks with an increase in the enlargement during each attack. Finally the part attains enormous size. Its contour is lost, its surface smooth and shiny, folds of the skin obliterated, and its color becomes dark. Some of the lymphatics may become varicose and may rupture, discharging a clear or milky fluid which appears to sap the patient's strength. Odor of sweat and decomposing fluids is very offensive. The most common location is the lower extremities, one or both, but it also affects the genitals, arms, face, ears, breast, and tongue. The lymphatic glands may become enlarged. Eczema with intense itching may develop. The disease is rarely fatal.

Epithelioma

Definition.—A chronic progressive malignant growth of the skin or mucous membrane characterized by the formation of ulcers with raised, hard, waxy edges recurring after removal.

Adjustment.—Local and K. P.

Pathology.—It has a fibrous stroma containing blood vessels and lymphatics upon which are situated numerous epithelial cells which also infiltrate the deep layers of the corium. This growth undergoes degeneration, is of a malignant character, and may be the seat of much ulceration which progressively destroys the tissue in which the cancer is situated.

Symptoms.—Epithelioma often occurs upon old scars, moles, warts, fissures, pimples, or scaly spots and most often occurs

upon the face, especially the lips, eyelids and nose. The enlargement may begin as a small, hard, red, waxy-looking papule with or without itching and pain. After a time the surface of the growth becomes the site of an ulcer which gradually deepens through the skin into the muscles and bones.

The epitheliomatous ulcer is irregular in shape with raised wax-like edges. The floor of the ulcer is uneven and bleeds easily. It is covered with a brownish crust or a purulent secretion. The neighboring lymphatics are enlarged early in the disease and ultimately may break down and ulcerate. Epitheliomas may occur singly or in groups. They usually attain a larger size than the visceral carcinoma. When the cancer spreads from a narrow base, it is spoken of as the cauliflower variety. In this variety there are deep fissures which give off an offensive discharge. The principal subjective symptom is pain which may be intermittent or continuous and varies in severity. The duration varies with the degree of malignancy. Over fifty per cent of this form of cancer grow upon the lower lip.

Rodent ulcer is classed as a form of epithelioma of low malignancy. Pathologically there is no special distinction between rodent ulcer and carcinoma except that in the ulcer the growth of cells is greater beneath the skin than above and the direction in which it extends is always perpendicular to the skin. It most commonly occurs after middle life and upon the upper half of the face, especially at the root of the nostril and side of the nose. The ulcer is round in shape, varies from one to three inches across, progresses very slowly, is painless or nearly so, and has gnawed-like edges. It may exist for years before the terminal stage is reached which is characterized by emaciation, weakness, and cachexia.

Erythema Roseola

Definition.—A form of primary erythema most common in children characterized by irregular shaped and sized macules of a few hours' duration.

Adjustment.—S. P. or lumbar, with K. P.

Symptoms.—This form of erythema is most common in children but affects people of all ages. Nearly all cases follow or arise as a result of digestive disturbances. It begins with a rise of temperature, coated tongue, restlessness, and anorexia. Fever is accompanied by red blotches of various size and shape which may be localized or general and which lasts but a few hours to one day. The condition may last several days with new blotches appearing upon other parts of the body. The short duration of the blotches with digestive symptoms makes the recognition easy.

Erythema Multiforme

Definition.—An inflammatory disease of the skin characterized by symmetric red macules, papules, and vesicles of various shape and size running an acute course.

Adjustment.—C. P. and K. P.

Symptoms.—This is believed to be an angioneurotic disturbance produced by some toxic irritant in the circulation. The disease begins with feverishness, malaise, aching pains, and anorexia, which are followed by eruptions of macules, papules, vesicles, and sometimes blebs. No part of the body is exempt from this eruption, but it is most common on the extensor surface of the extremities. The eruption is attended by intense itching and burning pain which are constant. One characteristic feature of the disease is that always two or more forms of eruption are present. Occasionally the eruption is confined to the skin over the joints around which there has been rheumatoid pains. The fever subsides upon the appearance of the eruption. The duration is from one to four weeks, and the prognosis is favorable.

It is most common in spring and autumn and is often described according to the eruption which predominates. When papules predominate, it is called **erythema papulatum.** When the papules enlarge to the size of tubercles, it is called **ery-**

thema tuberculatum. If the lesions continue to enlarge, the center becomes depressed, forming a ring-shaped figure and is called **erythema circinatum.** If several such rings form by successive exudation, it is called **erythema iris.**

Erythema Nodosum

Definition.—An acute inflammatory condition involving all elements of the skin characterized by strictly defined rounded or oval tender swellings most commonly found on the shins in young women.

Adjustment.—K. P. and lower lumbar.

Pathology.—The changes are those of acute inflammation of all tissues of the skin with dilated lymphatics, congested vessels, and small cell exudation.

Symptoms.—This begins with malaise, fever, and unusually severe pain in the legs and is soon followed by the appearance of nodular red swellings, varying in size from that of a small nut to an egg upon the anterior surface of the tibia. They are firm under palpation and extremely tender. Upon undergoing absorption they look like a bruised spot. They may vary in number from one to twelve and usually last from two to four weeks. The prognosis is favorable.

Favus

Definition.—A disease of the skin characterized by discrete or confluent, circular, pale, sulphur-yellow or asbestos-like grayish crusts.

Adjustment.—K. P. is the most important adjustment, but other adjustments to increase the elimination may be included.

Symptoms.—This begins as an erythematus patch or as a group of small vesicles, smaller than those found in ordinary ringworm, upon the scalp or nonhairy parts of the skin. They undergo rapid changes forming yellow crusts around the hairs. The hair becomes dull and lusterless and falls out in

places, leaving irregular bald spots of red skin. The crusts have rounded edges, are cup-shaped, and are sulphur-yellow in color. One or more hairs grow out of the center of the crust, which is about the size of a split pea. As the crusts become aged, they turn grayish in color and have a peculiar odor of mice or old straw. These crusts may remain discrete or coalesce and are always situated around the hair follicles. The edges of the crust finally become detached and raised. When removed they leave a moist, red surface. They are firm to the touch and crumble between the fingers like mortar. The hair is often dry, split, and easily extracted. Itching is the only subjective symptom. Pustulation does not belong to this disease but may occur as a complication. The cup-shaped, sulphur-yellow crusts are pathognomonic of favus and are also the most important differential symptom from simulating disease. This is also called **honeycomb ringworm** and **porrigo.**

Fibroma

Definition.—Fibroma is a soft tumor of the skin composed of a hyperplasia of the cutaneous and subcutaneous connective tissues.

Adjustment.—Local in combination with K. P.

Symptoms.—Fibromas are most commonly found upon the trunk. They may be pink, brownish, or normal in color and round, flat, or pedunculated in shape. They are always raised above the surface of the skin and are of a soft consistence upon palpation. They may have small tufts of hair growing from them or they may be perfectly smooth. They vary in number from one to hundreds but when numerous are found distributed in many parts of the body. They have no subjective symptoms and cause the patient no inconvenience unless they attain enormous size. As a rule they are the size of a cherry or even as large as a walnut but may become as large as a child's head. They always grow slowly and after attaining a certain size remain stationary. When they are pedunculated and hang down like polypi, they are called

fibroma pendulum. They differ from lipoma in not being lobulated and in projecting above the level of the skin. Lipoma is encapsulated beneath the skin.

Furuncle

Definition.—An acute suppurative inflammation around a cutaneous gland or follicle, characterized by one or more painful formations terminating in necrosis.

Adjustment.—Local and K. P.

Pathology.—The inflammation begins in the corium, in or around the hair follicle or glands of the skin with hyperemia, swelling, induration, suppuration, and discharge of pus. After the pus is discharged, granular tissue forms, leaving a scar.

Symptoms.—Boils most commonly appear upon the neck, face, forearms, buttocks, and legs. A boil begins as a small round, red, painful spot which progressively enlarges until the fourth or fifth day, when it develops into a papule the size of a pea to that of a quarter of a dollar. This papule is raised above the level of the skin, is dark red in color at the center, and is light red at its edge. There is great tenderness with some throbbing pain. In a few days the center becomes yellow, indicating the formation of pus. Upon perforation of the skin, bloody pus and a core of a greenish color are discharged, leaving a cavity which is later filled by scar tissue. If suppuration does not occur, the papule does not point and is called **a blind boil.** Boils may occur singly or in great numbers. When numerous the patient is said to have **furunculosis** and has fever, chills, sweats, and enlarged lymphatics. Boils affecting the sweat glands are less common, are smaller in size, and are often of the blind variety.

Herpes

Definition.—An acute inflammation of the skin characterized by an eruption of one or more groups of vesicles situated upon a red base.

Adjustment.—Since herpes is usually symptomatic, the adjustment should be made locally, depending upon the causative disease.

Symptoms.—**Herpes facialis** is the most common form and is so named when occuring upon any part of the face. It is commonly called **cold sore, fever blister, herpes febrilis,** and **herpes labialis.** The patient first notices a burning, itching, or stinging sensation in the affected part, which is also erythematous. This erythematous patch is soon covered with a multitude of minute vesicles. There may be more than one such patch, but they are always few in number; the vesicles upon the patch are numerous. In a few days the vesicles dry up and form a crust, which is soon shed without leaving a scar. Herpes may form upon the lips or around the nose or eyelids. Herpes is symptomatic of respiratory catarrh, fever, or gastric disorders.

Herpes progenitalis is that form occurring upon the genitals. They begin with a similar burning, itching, and stinging with a reddened base, upon which soon appears numerous small vesicles. These vesicles are always isolated and not confluent and vary from eight to thirty-five in number. There may be a swelling of the groin glands. About eighty per cent of herpes progenitalis is found in women during menstruation and lasts from eight to ten days.

Ichthyosis

Definition.—A localized or general disease of the skin characterized by dryness, harshness, scaling, and sometimes warty-looking growths.

Adjustment.—K. P.

Symptoms.—**Xeroderma** is the simplest form of the disease. It is characterized by dryness, harshness, scaliness, and grayness of the skin with pronounced lines running across the trunk or extremities. This may be limited to the extensor surfaces of the extremities or may become general over the entire body. The secretion of sweat and sebum is suppressed, hence the dryness.

Ichthyosis simplex is a more severe form in which the skin is dry and scaly and divided into small squares or diamond-shaped figures. It is more often localized upon the extensor surfaces of the extremities. The face, palms, soles, and scalp are usually not affected, while the elbows and knees are most often involved. The skin is thrown into folds, between which are small superficial fissures, giving it the scaly appearance from which it obtains the name fish-skin disease. The scaly patches have upturned edges and depressed centers, the hair is dry, the nails may be pitted, and the patient is very sensitive to the cold. These cases are aggravated by the cold during cold weather and are less severe during warm weather.

Ichthyosis hystrix is a very rare form which is always localized and usually unilateral. It often follows the course of distribution of a nerve which would indicate the adjustment of the local vertemere. It is characterized by horny papillary growths, pinpoint in size, which may be massed together into elevated, warty-like plates of dark green color and transversed by deep lines or fissures that may be arranged into parallel lines. This form of ichthyosis is sometimes called neurotic papilloma.

Ichthyosis congenita is also called keratosis and keratoma follicularis. The condition is present at birth and is a very rare occurrence. The skin is covered with fatty-like plates or scales which are cracked in all directions. The deep fissures which exist in the skin extend down to the corium. The lips and eyelids are often immovable, the feet may be deformed, and the skin is yellow or gray in color. Most of these cases are born dead or soon die. The prognosis under adjustments is uncertain.

Impetigo Simplex

Definition.—A disease of the skin characterized by an eruption of pustules that are pustules from the beginning.

Adjustment.—C. P. and K. P.

Symptoms.—The onset is with malaise, anorexia, constipation, and feverishness. The eruption consists of one to a dozen pustules, that are pustules from the beginning. These pustules are about the size of a split pea; they have thick walls, are not fully distended, have a very small areola without induration, have no central depression, do not rupture, and are yellow in color. They usually occur upon the face, hands, and feet and are much more common in children. There is no burning or itching; it is not contagious and leaves no scar or pigmentation. The duration is a few weeks, and the prognosis is favorable.

Impetigo Contagiosa

Definition.—An acute inflammatory disease of the skin, occurring upon exposed parts, as a rule, and characterized by vesicopustules or bulla.

Adjustment.—C. P. and K. P.

Symptoms.—The onset is with slight febrile disturbances and is followed by an eruption of vesicles and pustules, occurring in successive crops. The lesions vary in size but average that of a split pea and are at first surrounded by a red areola or halo which soon fades. The pustule gradually increases in size and sometimes assumes an annular shape. They are not fully distended but flaccid and resemble a burn. In a few days the contents dry up, forming a crust with upturned edges. Rare cases have large bulla several inches long and of irregular shape, which become purulent. These bulla are formed by two or more vesicles coalescing. They have depressed centers and last much longer than the pustules. Impetigo contagiosa most commonly affects the chin and hands of children; it has no definite course and is often epidemic.

Differential Symptoms.—Impetigo differs from pustular eczema in that eczema has intense itching; its pustules soon break down, forming dark green crusts; and the pustules in eczema are smaller and much more numerous.

It differs from smallpox by the absence of high fever and

backache, absence of papules and progressive changes, absence of pitting, absence of definite duration, and in that its vesicopustules are localized.

It differs from pemphigus in that the latter occurs in adults, is not contagious, is more general in its distribution, is very chronic in its course, tends to return from year to year; its bulla are fully distended and has no areola; and the prognosis of pemphigus is less favorable.

Impetigo Herpetiformis

Definition.—A very rare form of impetigo characterized by grouped pustules in localized areas of the skin.

Adjustment.—C. P. and K. P.

Symptoms.—This form of impetigo is found almost exclusively in women. It begins with an eruption of pustules which are grouped in small patches upon the breasts, axilla, and groin. These pustules are pinhead in size and upon drying form brown crusts, around which new pustules form, thus enlarging the surface affected. Within three or four months the whole surface of the skin is swollen, red, and hot and covered with brown crusts showing torn and excoriated places. There is a continuous remittent fever from the beginning, and each outbreak of pustules is marked by severe chills and high fever. Emaciation and weakness progressively increase. The prognosis is uncertain as few, if any, cases have been adjusted.

Keloid

Definition.—Keloid, which is also called cheloid, is a connective tissue growth of the skin occurring most commonly upon the chest, its characteristics being hardness, pink color, and prolongations extending in all directions.

Adjustment.—Local and K. P.

Symptoms.—Keloid is most common after puberty in the Negro race and consists of a fibrous growth of dense consis-

tency resembling scar tissue. Most cases have a history of injuries to the skin which would indicate that traumatism is a predisposing cause. These growths may be one or more in number. They are firm, pink, freely movable, and oval or elongated with claw-like processes given off which extend in all directions. Keloids assume all sorts of shapes and sizes. The surface may be smooth or nodular. Pain and pruritus may be present. The favorite location is upon the upper half of the sternum, although many cases involve the face; and extreme cases may affect the greater part of the body. It runs a very slow course and is not fatal.

Leprosy

Definition.—A chronic disease of slow progress characterized by anesthesia, redness, tubercles, atrophies, and deformities.

Adjustment.—Local and K. P.

Pathology.—In the tubercular type nodules form upon the skin, nerves, and blood vessels in localized regions and undergo a slow dissolution with ulceration and ultimate destruction of the parts of the body affected.

In the anesthetic type the principal change is a slow and gradual atrophy of the skin and its underlying structure, including the arteries and arterioles, causing their obstruction and dry gangrene as a result.

Symptoms.—**Tubercular leprosy** begins insidiously with prodromes of ill health, diarrhœa, chills, profuse sweats, and remittent fever. This fever may precede the other prodromal symptoms and also recurs with each new outbreak of tubercles. After a time a red eruption appears upon the face, ears, arms, or legs. The eruption consists of oval, hyperesthetic, purplish spots, one or more inches in diameter, which disappear with the fever and recur upon the return of the fever. Three to six months after the eruption the tubercles appear as pink, pinhead-sized papules, which may enlarge to the size of an egg. These tubercles are anesthetic and often coalesce, mak-

ing the parts affected have a nodular appearance. The tubercles usually appear upon the lips, eyebrows, ears, and digits but never in the palms, soles, or scalp. The tubercles may break down, forming leprous ulcers, which slough and have a peculiar odor. As a result of this ulceration there is amputation of the digits or even extremities, or they leave large scars. All changes are very slow so that before there is much sloughing, the face is deformed and studded with tubercles, the eyebrows hairless and thick, the eyes sunken, the ears hang down, the lips protrude, the forearms enlarged and knobby, the hands deformed, and the lymphatics swollen. Sight and hearing are usually lost, the voice is hoarse, and offensive discharges are given off from the nose and throat. There is always sterility. The average duration is eight years. About forty per cent of the cases die from the disease, forty per cent from kidney trouble, and the rest from anemia.

Anesthetic leprosy begins with shooting pains which extend along the principal nerve trunks of the extremities affected. General hyperæsthesia and itching may occur upon different parts of the skin. Frequently there is a vesicular or bullous eruption upon the fingers or toes which becomes purulent and upon breaking leaves an anæsthetic scar. Malaise, digestive disturbances, and extreme muscular weakness may also exist in the prodromal stage.

After several months of prodromal symptoms a macular eruption appears upon the face, lips, extremities, and back. The macules are oval in shape, pale yellow or brown in color, enlarged around the edge, and clear up in the center. They are hyperæsthetic at first but soon become devoid of sensation. The large nerve trunks harden and become like whipcords under palpation. Areas of numbness may exist independently of the macules, and in old cases the entire skin becomes anæsthetic. The muscles of the hands and feet undergo a marked atrophy. Permanent flexion of the last phalanges of the hand gives a characteristic appearance in practically all cases of this type. After the macules and anæsthe-

sia, the skin undergoes atrophy, leaving it a very pronounced white color; and toward the later stages most of the body may have assumed this color. The hair is lost, the skin is wrinkled, the nails drop off the digits, or even extremities may be amputated due to dry gangrene. Hebetude and insomnia are present in almost all cases. Many cases present symptoms of both types and are spoken of as mixed forms but named according to the predominating symptoms. The average duration of this form is fifteen years, and the prognosis is uncertain.

Leukoderma

Definition.—Leukoderma or leukopathia is an acquired loss of the pigment of the skin and is usually accompanied by hyperpigmentation of other adjacent parts.

Adjustment.—When primary it is a trophoneurosis of the skin due to impingement upon the nutritive nerve supplying the affected part. Most cases are secondary or symptomatic of other diseases, such as neuræsthenia, syphilis, Addison's disease, and morphea. When symptomatic the adjustment should be made for the disease of which it is symptomatic.

Symptoms.—It usually begins upon the neck, face, or hands as a small white spot devoid of normal pigment. The spots vary in shape and may be as small as a dime or so large that they cover the major portion of the body. They develop slowly and may become stationary at any time. The adjacent skin may become darker than normal due to the deposit of extra pigment. As a rule the general health is not affected and sensation remains normal. When the scalp is involved, the hair turns white. The condition is more evident in the summer months because of the tanning of the normal skin, which gives to it greater contrast.

Lichen Planus

Definition.—A chronic and inflammatory disease of the skin characterized by small, flat, angular, umbilicated, red papules with intense itching.

Adjustment.—Local with K. P.

Symptoms.—The structural changes are those of inflammation occurring in the corium around the sweat glands and palpillæ. It begins with an eruption of small papules of a purple or crimson-red color one-sixteenth to one-sixth of an inch in diameter. They have small depressions in their center with a smooth and shiny surface. When fully developed the papules become gray with red borders and may remain discrete or arrange themselves into rows. When forming patches they become scaly and have no definite shape but are lilac colored. They most commonly occur upon the flexor surface of the extremities. The general health is good unless interfered with by loss of sleep from the intense itching.

Lichen Ruber Acuminatus

Definition.—It is a chronic progressive disease of the skin marked by an eruption of small red conical papules tipped with a scale.

Adjustment.—K. P.

Symptoms.—This disease begins as a discrete eruption of millet seed size papules which have slight itching. The papules are red in color, conical in shape, hard in consistency; and each is tipped with a scale. They first appear upon the flexor surface of the extremities and trunk. New papules form, enlarging the patch or area until most of the body is involved. The single papules, however, never increase in size. Later in the disease the papules may grow so close together that they form a continuous red infiltrated patch covered with scales. This gives to the skin a stiffness which interferes with movements of the joints. There is intense itching and disturbances of nutrition which is indicated by marasmus, uneven brittle nails, and great prostration.

Two-thirds of all cases are found in adult males.

Lupus Erythematosus

Definition.—A chronic superficial growth of the skin characterized by sharply defined localized red patches having gray scales.

Adjustment.—Local in the upper cervical region and K. P.

Symptoms.—This form of lupus begins with pinhead-size scaly red spots, the border of which may be raised. They are situated upon the nose, cheeks, ears, or scalp and grow slowly, but finally coalesce, forming large patches, having well-defined raised edges. The patches are covered with gray scales, beneath which it is red or pink in color. A mild itching and burning may be present, but often there are no sensory disturbances. Usually the eruption is symmetrical and when situated upon the nose and cheeks gives to the face a peculiar butterfly appearance, the ridge of the nose representing the back of the butterfly and the cheek its wings. When occurring upon the scalp, it leads to permanent loss of the hair. The disease may become stationary after a time, and the general health may be unaffected.

Lupus Vulgaris

Definition.—A localized tuberculosis of the skin.

Adjustment.—Local and K. P.

Symptoms.—The structural changes are those of tuberculosis when occurring in other parts of the body. This usually begins upon the nose and cheek as one or more deep-seated, dull red spots consisting of small papules which enlarge and coalesce. They are of an apple-jelly color and soon become scaly. They are not symmetrical, varying in size and shape. These papules are always elevated above the level of the skin. The center of the patch is much lower than the border and eventually is atrophic. In rare instances the patches entirely disappear, leaving a fine, smooth scar; but more often they break down and form ulcers which are round in shape with easily bleeding floors and a moderate amount of purulent se-

cretion that dries into a crust. There is always a dense growth of scar tissue which causes the parts affected to atrophy and greatly diminish in size. There may be signs of the disease in other parts of the body.

Lymphangioma

Definition.—A benign growth of the skin involving the superficial lymphatics. It is also called **lymphangiectasis.**

Adjustment.—Local and K. P.

Pathology.—The superficial lymphatics become dilated, forming ampullary swellings at the surface of the skin which may remain discrete or become fused into masses. These swellings contain lymph, which, if drained, soon fills again.

Symptoms.—This begins as a thick-walled vesicle, several of which are crowded together in irregular-shaped groups, giving the skin a warty appearance. Each vesicle varies from the size of a pinhead to that of a half dollar and is always flat. They are usually pink in color but may contain a straw-colored serum or blood which would cause a change in the color. They spread slowly from the periphery with much thickening of the skin. Upon palpation they are firm and give to the skin a feeling of stiffness. Large areas of the skin may be involved by the tumorous mass, which is about one-fourth inch in thickness. There is little or no pain attending this affection. Males are more often affected than females, and as a rule the disease begins early in life.

Miliaria

Definition.—An affection of the sweat glands characterized by a discrete eruption of papules or vesicles.

Adjustment.—K. P. should always be adjusted. If the condition is symptomatic, the adjustment would depend upon the causative disease.

Symptoms.—Miliaria is divided into two main classes known as sudamina and pricky heat.

Sudamina occurs during the course of fevers and consists of

numerous, closely set, pearly vesicles without any inflammation. These vesicles dry up and disappear in a few days without any subjective symptoms. They are due to a closure of the sweat pores and retention of sweat under the skin.

Prickly heat is also called lichen tropicus and occurs during warm weather or when warmly clothed. It is characterized by an eruption of pinpoint papules upon a reddened skin and attended by itching, prickling, and burning, which is increased by heat and moisture. These papules occur in great numbers, are closely set, and may be localized or general in their distribution. This is most commonly found in children and obese individuals. It is due to a congestion around the sweat glands.

Morphea

Definition.—A chronic circumscribed hardening of the skin. It is also called **Addison's keloid.**

Adjustment.—Local and K. P.

Symptoms.—This begins as a red or lilac colored macule which enlarges at the periphery and becomes pale and hard in the center. It soon forms an irregular or band-like patch which becomes yellow, pink, or brown in color. The skin over the patch is smooth but when pinched between the fingers feels hard and leather-like. There may be one or several such patches, some of them being level with the skin and some being raised. Sensation is always retained in the affected area. The condition most commonly manifests itself upon the trunk, especially the breasts, and on parts of the face supplied by the fifth cranial nerve. The disease has no definite course but usually terminates by suddenly disappearing, undergoing ulceration, or leaving patches of leukoderma and chloasma.

Nevus Pigmentosus

Definition.—A congenital, circumscribed, hyperpigmentation of the skin. It is also called the **pigmentary mole** and **mother's mark.**

Symptoms.—This may consist of pigment only and not raised above the level of the skin; and when such is the case, it is called **nevus spilus.** There may be hypertrophy of connective tissue, causing it to be raised above the surface, giving it a warty appearance and is then called **nevus verrucosus.** If hair grows from either form, it is called **nevus pilosus.** This form of nevus may be unilateral or bilateral, consisting of one or hundreds of small or large patches of a brown color. They may be located on any part of the body but are especially common on the face, neck, and back. When hair grows from the nevus, it is coarser and darker than elsewhere. There are no subjective symptoms. The condition is not altered in any respect by adjustments.

Nevus Vascularis

Definition.—A reddish spot or area due to an increase in the number and size of the cutaneous capillaries.

Symptoms.—They appear at birth or during the first month of life and are usually single but may be multiple. They vary in size, shape, and color; but all become pale upon pressure. They may be but a small pinhead spot under the skin or a large erectile, pulsating tumor. They may be pink, light red, dark red, or purple in color. When situated upon the face, they become more pronounced upon crying, coughing, or straining. They sometimes grow in proportion to the child's growth, sometimes remain stationary, and occasionally disappear. They are most common on the face and head and are also called the port-wine mark.

Pemphigus

Definition.—An inflammatory disease of the skin characterized by the development of successive crops of blebs varying in size from a pea to an egg.

Pathology.—There is an inflammation of the papillary layer of the skin with a sudden effusion of serum between its layers,

causing the same to be raised and filled with a fluid which becomes puriform with age.

Adjustment.—K. P.

Symptoms.—**Pemphigus vulgaris** is the common form and may begin acutely with fever or more slowly without fever. The first symptom indicating the nature of the disease is the appearance of successive crops of blebs the size of a pea to that of an egg, containing a clear fluid. As the blebs become older, their contents become cloudy and purulent. The blebs occur abruptly without any sign of inflammation and have a definite line of demarcation. In a day or two they are surrounded by a red halo and gradually dry up in from three to ten days, leaving a crust. They are followed by the appearance of a new crop of similar blebs. This eruption may occur upon any part of the body but shows some preference for the lower part of the face, trunk, and limbs. Itching and burning may be present to a slight degree. If the blebs are large and numerous; they coalesce, rupture, and leave large ulcers which greatly impair the patient's health. The condition is then called pemphigus malignus.

Pemphigus foliaceus differs from the simple type in that the blebs are flaccid, being only partially filled with serum. They always rupture before maturing; and the discharge fluid hardens into white flakes which fall off, leaving the skin red and excoriated. In time the skin looks as if scalded, being red, stiff, and extremely painful. After a duration of several months or years the patient passes into the typhoid status, and death results from asthenia.

Pityriasis Rosea

Definition.—An acute self-limited disease of the skin characterized by red macules that enlarge into dry, scaly, oval-shaped patches.

Adjustment.—K. P.

Symptoms.—This disease is more common in children and young adults. It begins with an eruption of slightly elevated

macules or papules on the upper part of the chest or upon the anterior part of the abdomen on a level with the waistline. This eruption spreads peripherally into oval patches whose borders become higher than their centers. After the patch becomes one-half inch in diameter, the center becomes yellow and scaly, leaving a pale red border. Later the center scales off leaving red rings which are scaly. Two or more of the rings may coalesce forming gyrate figures, which finally disappear. All parts of the body except the hands, feet, and face may be affected; and all stages of development of the disease are found in a well-formed case. As a rule there is little or no sensory disturbance, but slight itching may be present when warm.

Pityriasis simplex is a form of scaling of the skin which is especially noticeable on the scalp, where it is known as dry dandruff. The scales are white in color and become mixed with the hair. The hair is dry and the head itches, especially when warm. Alopecia follows after several years' duration.

Pompholyx

Definition.—An inflammatory disease of the skin of the palms and soles having small vesicles which dry up and scale off.

Adjustment.—Local and K. P.

Pathology.—This is an inflammatory condition of the skin with vesicles containing a clear serum, not sweat, which is neutral or alkaline in reaction and mixed with albumin and fibrin.

Symptoms.—The onset is with burning and itching of the palms and soles or the sides of the fingers and toes. In a few hours small, clear vesicles appear, usually grouped upon a red base and may coalesce to form larger ones. They do not rupture but dry up in a few days. Their covers fall off leaving small dry red spots. If the vesicles are numerous, all of the skin may peel from the affected parts. In the slight cases the palms and soles may be dotted with small red spots having

ragged edges. The back of the hands and feet are not affected. Most patients having this disease are in poor general health, having nervousness, hyperhidrosis, and prickly heat on some part of the body. The condition lasts a few weeks, usually is confined to the summer months, and always has a favorable prognosis.

Psoriasis

Definition.—A disease of the skin characterized by an eruption of round, red patches, covered with thick silvery-white, adherent flakes.

Adjustment.—Principally K. P. The important thing to accomplish is to restore elimination to normal.

Symptoms.—The primary lesion is a bright red, pinhead size, flat papule tipped with white scales. This enlarges by peripheral extension into a patch. When the patch is about one-fourth of an inch in diameter, its thick scales give it the appearance of a drop of mortar; and it is then often spoken of as **psoriasis guttata.** When coin-sized, it is called **psoriasis nummularis.** A single patch may attain the size of a silver dollar and retain its round shape; but most large patches are irregular in shape, being formed by small ones uniting. The irregular-shaped patches give to the skin a map-like appearance, from which they obtain the name **psoriasis geographica.** Upon maturing, the center of the patch clears up, leaving a ring called **psoriasis circinata.** When the greater part of the body is affected, it is called **psoriasis universalis.**

Every case does not exhibit all of these symptoms, but in all cases an area of redness extends a little beyond the scales. The scales are constantly shed and renewed; they are readily scraped off with the nails and leave a glistening membrane having red dot-like spots or points. The scales are silvery-white or gray in color, darker scales being due to a mixture of dirt or blood. The skin is always dry, never having a moist discharge. Psoriasis may occur upon any part of the body but is most frequently seen on the elbows, just below the

knees, and upon the scalp. When found on the scalp, it is more apt to spread to other parts of the skin. A red scaly line on the forehead just below the hair line is very characteristic of psoriasis. Usually the hair does not fall out; but if alopecia does occur, it is only temporary. In old cases the skin may be greatly thickened and fissured; and the fingernails may be fissured transversely, discolored, and cracked. Itching may be present at times but is of little importance in recognizing the disease. Most cases are better during the summer months and worse in cold weather. Most cases begin before the thirtieth year. The prognosis is favorable.

Scleroderma

Definition.—A chronic disease of the skin characterized by thickness and rigidity.

Adjustment.—K. P.

Symptoms.—This affection is most common in young or middle-aged women and may begin anywhere but usually on the upper half of the body. It may begin with symmetrical patches or develop on all parts of the body at once. The principal feature of the disease is that the skin is hard and cannot be pinched into folds. This firmness is due to an infiltration of serum and cells in the subcutaneous tissue and to the fact that the skin is firmly attached to the deep underlying structures. The skin is of normal color, scaly, and does not pit upon pressure. When occurring in patches their outline can be better felt than seen. The stiffness of the skin may interfere materially with movement of the joints. Late in the disease the face may become involved so that the eyelids cannot be closed and the facial expression remains unchanged. Respiration may be suppressed from the inability of the chest to expand properly. The temperature of the skin may be lowered due to interference with the cutaneous circulation. Sensation is finally altered, and the second stage supervenes. The second stage is called the atrophic stage, being characterized by a

progressive atrophy causing the whole body to have a shrunken, corpse-like appearance. Although marasmus may be extreme, the general health is not materially affected; and the patient may live many years.

Sebaceous Cyst

Definition.—A small tumor of the skin due to the retention of sebum in the sebaceous glands. It is also called a **wen.**

Adjustment.—Local and K. P.

Symptoms.—Wens may occur anywhere on the cutaneous surface but are most common on the scalp, face, neck, and back in the order named. They vary in size from millet seed to an orange but are usually slightly less than a small marble. They are round in shape, and when small a part of their contents may be pressed out. The skin over them is pale due to pressure anemia of the overlying cutaneous capillaries. At first they are elastic or doughy to the touch; but as the contents solidify, they become hard and firm. They grow slowly without any subjective symptoms. When occurring on the scalp, there is no hair upon the skin over the cyst.

A wen differs from a lipoma in that the latter is larger, firm from the beginning, lobulated, more flat in shape, more numerous, and rarely found upon the scalp.

Seborrhea

Definition.—A secretory disorder of the sebaceous glands characterized by hypersecretion of sebum which may be too fluid or too solid, forming an oily coating or greasy crusts on the skin.

Adjustment.—K. P.

Symptoms.—The normal secretion of sebum is not visible to the naked eye, but when secreted to excess and of fluid consistency it gives the skin a greasy appearance and is called **seborrhea oleosa.** The extent of the secretion varies from

enough to give the skin a slippery feeling to large drops or beads of oil. This oil catches dust, which mixes with it, giving the skin a dirty appearance. It is most noticeable on the skin of the nose, forehead, chest, and shoulders. When the secretion is thick, forming crusts; it is called **seborrhea sicca** and is most commonly found on the scalp where it forms one of the varieties of dandruff. These crusts of oil collect around the roots of the hair and are of yellow color. The entire scalp may be involved, but as a rule the crown and vertex are affected more pronouncedly than the rest of the scalp.

Scabies

This is also known as the **itch.**

Definition.—It is an acute infectious parasitic disease of the skin caused by an animal parasite named the Sarcoptes scabiei. It is characterized by burrows with intense itching and a variety of skin lesions due chiefly to scratching.

Etiology.—Scabies are essentially a filth disease; the parasites thrives upon a dirty skin. The condition is common in camps, steerage of ships, and poor tenement quarters. The disease is transmitted by contact or old clothing or by the occupancy of dirty beds or berths. The female scabiei is larger and more numerous than the male, being about 1/60th of an inch in diameter. It is provided with eight legs; on the four front legs there are suckers, and each posterior leg has long bristles. The female after impregnation burrows into the skin as deep as the mucous layer of the epidermis; her burrow then continues parallel with the surface of the skin usually a distance varying from one-fifth of an inch to 2½ inches. In this burrow she deposits her eggs which hatch in about one week. After laying her eggs, the female dies in the far end of the burrow. The young, upon hatching, come out through the skin and become fertilized while on the surface. After fertilization the males die, and the females re-enter the burrow and form their own burrow which is usually perpendicular to the one in which they were hatched. In this way the

disease spreads by peripheral extension to almost all parts of the body. The scabies may be transferred from one part of the body to another by the fingers.

Symptoms.—The parts of the body most commonly attacked are the sides of the fingers and the folds where they join the hands, the lower part of the abdomen, the external genitals, the wrists, thighs, and buttocks. When the itching begins, careful inspection of the skin with a magnifying glass will reveal a slight raised line representing the course of the burrow varying from one-tenth to one-half inch in length. This burrow is light in color but darker at each end. One end of the burrow is enlarged more than the other and marks the location of the scabies. Itching is the most pronounced symptom, and it is usually worse at night and when the skin is moist with sweat. The patient usually resorts to violent scratching which brings about an artificial dermatitis; and the lesions that accompany this dermatitis correspond to the injury produced and infections from skin bacteria that may develop. The scratched areas always show a marked hyperemia with excoriations here and there.

Papules are the most numerous and common lesion. They are small in size and frequently are broken open with the fingernails. These papules may be followed by vesicles and pustules. When these lesions are broken open, ulcerations may form upon which there is exudate. The surrounding skin is usually indurated and rough. In cases that control scratching the skin may have no lesions other than the papules with an intervening hyperemia. The more severe lesions follow excessive scratching.

The treatment of this disease is purely medicinal. The scabies are animal parasites and must be killed before the dermatitis disappears. An effective means of eradication is a thorough application of sulphur ointment. After applying this over the entire body, a cotton union suit should be put on and kept on for four days and four nights. Each night a fresh application of the ointment should be applied. At the end of four days

this clothing may be removed and a bath and change of clothing and change of bedclothes made. It is rarely necessary to repeat more than once.

Sycosis

Definition.—An acute or chronic inflammation of the hair follicles of the face characterized by papules and pustules perforated with hairs and by much crusting.

Adjustment.—Middle cervical and K. P.

Symptoms.—This disease is also called folliculitis barbæ and by some authors barber's itch. However, it should be borne in mind that this is not the true barber's itch.

The disease begins with a formation of numerous red papules, conical in shape, raised above the surface, and always perforated by a hair. It is preceded or accompanied by disagreeable sensations or prickling, burning, smarting, or a feeling of tension in the skin. The papules vary from millet seed to pea in size and soon form pustules which preserve the same characteristics. The discrete conical-shaped pustules perforated by hairs are pathognomic of the disease. The pustules undergo no rapid change, but in time the pus appears upon the surface in thin crusts which never become thick and is appreciable only when the beard is growing. In severe cases small cutaneous abscesses may form with enlargement of the neighboring lymphatics. The pus destroys the hair follicles, and hairless spots on the bearded region of the face may result. It may involve the scalp, eyebrows, and axilla but shows no tendency to spread to nonhairy parts of the body. The disease may become chronic after many recurrent attacks.

Tinea = Trichophytosis Corporis

Definition.—A disease of the skin and hair characterized by the formation of circular or annular scaly patches and partial loss of hair.

Adjustment.—K. P. and local.

Bacteriology.—Ringworm is caused by the presence of a

vegetable parasite called the Trichophyton fungus. This is the same fungus that produces ringworm of the scalp, beard, and foot known as athlete's foot. The fungus is readily transmitted from one individual to another providing the necessary lowered resistance of the skin be present. This lowered resistance of the skin is due chiefly to local enervation plus poor elimination. Infected skin usually develops papules, vesicles, and scales of varying size and shape and arranged in circular shaped patches in the early stages.

Symptoms.—This is the simplest form of ringworm and begins as a small pale red slightly raised spot which spreads into a round, sharply defined, scaly patch. The center of the patch clears up, leaving a ring-shaped border which may be vesicular or crusted from the drying of the vesicular contents. There may be a single patch, or they may be numerous and occur in groups. If two patches meet at their peripheries, they coalesce and form gyrate figures. In some cases the center of the patch does not clear up; and it then remains round, slightly raised, and scaly. The exposed parts of the body are most common sites for the eruption, but in rare cases ringworm may spread all over the body.

Eczema marginatum is a form of ringworm that is located in the groin or axilla. It is usually of a more highly inflammatory character than when found in other parts of the body. The edge of the patch is sharply defined, raised, scalloped, papular, and scaly while the center may be smooth or but slightly crusted. The patch often becomes large, running down along the inner surface of the thigh over the lower part of the abdomen and backward over the perineum. Usually the inside of both thighs are affected. There is considerable itching. When occurring in the axilla the same symptoms will appear.

Trichophytosis Capitis

Definition.—This is called ringworm of the scalp and is found only in infants and children.

Adjustment.—K. P. and local.

* Whitfield ointment (contains Benzoic acid + Salicylic ointment) or wash morning + night in 70% alcohol + cover with Lassar's paste

Symptoms.—This form of ringworm is found only in children, disappearing about puberty regardless of how severe it may have been previously. It begins as a single vesicle or as a small scaly patch. From this small beginning the spot spreads to form a large circular patch which is red, covered with gray scales, sharply defined, slightly elevated, and partially bald. The patch contains many broken off hairs with split ends. The hair in and around the patch is dry and lusterless. The patch may vary from the size of a ten-cent piece to a large area covering most of the scalp. When small patches coalesce to form large ones, they lose their circular outline and become scalloped. When they become one inch in diameter, they stop growing and remain stationary.

The one or more patches are attended by itching, which is the first symptom to attract attention to them. The most frequent locations are the vertex and parietal regions.

Trichophytosis Barbae

Definition.—It is also called ringworm of the beard and **barber's itch.**

Adjustment.—K. P. and local.

Symptoms.—At first it forms a scaly circular patch which increases in size, producing broken off hairs and a partially bald area. There are usually several of these areas on the chin, cheek, and neck. This is followed by the development of pustules which are situated upon the patch and are pierced by hairs, or a group of large nodular swellings from the size of a pea to that of a cherry may develop upon this circular patch. These nodules are red or purple in color, round in shape, and prominently raised above the surface of the skin. They rarely suppurate but may give off a sticky exudate or may remain hard and scaly. There is always some itching and burning attending these lesions. This differs from sycosis in that it affects the lower part of the face, sparing the upper lip, has broken off hair and grouped nodules, while sycosis is more acute and has no nodules; its pustules are discrete.

Urticaria

Definition.—An acute or chronic disease of the skin characterized by the formation of wheals. It is also called **nettle rash** and **hives.**

Adjustment.—K. P. in combination with S. P.

Pathology.—Urticaria is a vasomotor disturbance which is at first characterized by a spasm of the vessels in a localized area and immediately followed by their dilatation. A serous exudation ensues, forming the wheal, which is pink at first but later becomes white. The vasomotor disturbance is the result of a toxin in the blood which forms in the digestive tract when there is improper digestion; because of poor elimination it is permitted to remain in the body coming in contact with the skin.

Symptoms.—Most cases of hives are acute in nature, beginning with wheals, which are firm, flat, circumscribed elevations of pink color. If they are greatly swollen, they may become white in the center, leaving a red border of areola. They are always discrete and may vary in size but usually are about one inch in diameter. They are not symmetrical but usually develop on both sides of the body and as a rule are not limited to any particular part. Each wheal may last from a few minutes to a few days, always being of a temporary character. They itch, burn, tingle; and new ones form as the older ones disappear, recurring throughout the duration of the disease. In rare cases the wheals appear only at night and disappear during the day. The patient often describes the lesions as resembling mosquito bites, which they do to a great extent. Wheals may be produced in a patient having the disease by drawing the nail across the skin or by giving it a sharp tap. The acute cases may begin with or without fever and always disappear without roughness, scaliness, or desquamation of the skin. The duration is about one week.

Chronic urticaria differs from the acute only in duration; it lasts for months or years. As a rule the eruption is less ex-

tensive; and if itching has been present, excoriations and pigmented areas will be found upon examination of the skin. The wheals may assume different appearances in different cases, some being small, some large, others surmounted with a papule, and still others immensely edematous and the seat of hemorrhage. The prognosis is always favorable under Chiropractic adjustments.

Syphilis

Definition.—A chronic disease of slow progress, characterized by an initial lesion called the hard chancre and in the second and third stages by various cutaneous lesions.

Pathology.—See Syphilis in section on febrile diseases.

Symptoms.—The **primary stage** is characterized by the appearance of the hard chancre, two to six weeks after inoculation. In ninety per cent of the cases it is located upon the genitals. It always has an indurated base with a well-defined margin. Upon the hard base the initial lesion may take on the form of scaly patch, a dry or moist papule, a superficial erosion, or a circumscribed ulcer having perpendicular edges. Usually but one chancre appears in a single case, but they may be multiple. They give off a serous secretion and disappear in two or three months leaving a scar. During the initial stage the nearby lymphatics become painlessly enlarged but remain freely movable and rarely suppurate. About six weeks after the appearance of the initial lesion the skin becomes the seat of eruptive lesions called syphilides. With their appearance there is headache, malaise, sore throat, and pains in the joints. The eruption is divided into two groups known as secondary and tertiary syphilides.

Secondary Syphilides.—The first secondary lesion to appear is called the **macular syphilide** or syphilitic roseola. It consists of circular hyperemic spots on the face, trunk, and flexor surface of the extremities. They are of a faint rose red color, becoming purple when exposed to the cold, and vary in size from that of a split pea to a dime. They disappear on pressure.

Each macule lasts a week or ten days when it may entirely disappear, leave a pigmented spot, or form a papule. New macules form from time to time and may be intermingled with papules and pustules, but the macules always predominate.

These macules differ from those of the eruptive fevers by the absence of fever, catarrhal, and gastric symptoms, and by the slow changing of the macules. They differ from chromophytosis in that the macules are red, not brown, are not scaly, and are not capable of being removed by scraping. Most other skin diseases having macules can be differentiated from syphilis in that their macules are smaller, scaly, and not so general in their distribution.

The **papular syphilide** usually follows the macular but may be the first eruption to appear. The papules vary in size from that of a pea to one inch in diameter. They are round, red, and firm and after forming undergo changes slowly. The center of the papule sinks, becomes scaly, and then is gradually absorbed. They are very general in their distribution but are sometimes grouped. When the papules are very large, they are called the lenticular papular syphilide and if small are called the miliary papular syphilide.

In these large **lenticular syphilides** the superficial layer of the epidermis is absent at their centers, causing them to have a ragged edge near the base. This is an important diagnostic sign. They are bright red at first but later become the color of raw ham. When occurring upon the face they often group along the hair line and form pustules that crust. They commonly appear in goodly numbers on the palms and soles. They last from one to two months, leaving marked spots which later disappear. If they become pustular, they are called the **papulopustular syphilide** and upon becoming scaly are called the **papulosquamous syphilide.**

The **moist papule** or **mucous patch** is a modified form of the lenticular syphilide occurring upon mucous membranes or where two folds of the skin rub together. They are circular in shape, have a flattened surface, a depressed center, and a dull

red color at first, but are soon covered with a white coating. Their duration is long, and they are considered to be one of the most highly contagious of all syphilitic lesions.

The **miliary papular syphilide** is not so common as the lenticular. They are conical in shape, pinhead in size with depressed centers, and grouped around the hair follicles. When arranged in patches they become scaly, resembling psoriasis, but are not localized on the extensor surfaces of the extremities and have no itching and but little scaling. Upon disappearing they leave pigmented spots and sometimes permanent pits.

The **pustular syphilide** is the last eruption belonging to secondary syphilis and may occur early or late during this stage. This lesion usually follows the former ones but may occur primarily and always denotes a poor condition of the general health. These pustules may be attended with a slight fever of irregular course and indefinite duration. The pustules may be large or small in size and have a hard red base and an inflamed areola. The eruption may be general or localized, drying up in few days after forming and becoming covered with a yellowish brown crust which soon falls off, leaving a pigmented pit that in time disappears. The small pustules are called the **miliary pustular syphilide** or **syphilitic acne.** They are most common during the middle of the first year of the disease, being grouped on the trunk, face, and extremities.

The pustular syphilide can be differentiated from the other pustular diseases, because of having an infiltrated base, being more general, and always having one or more symptoms indicating syphilis.

Tertiary Syphilides.—The eruptions of this stage may occur as early as the second year or as late as the twentieth year but prior to their development there may be relapses of macules, papules, or pustules. The tertiary lesions are tubercles or nodules, the squamous, the pustulocrustaceous, gummatous and ulcerative.

The **tubercular** or **nodular syphilides** occur as clusters in the deep parts of the corium, are light red at first, but darken with age. Each individual nodule varies from the size of a pea to that of a hazel nut. They are round, firm, smooth, and somewhat elastic protuberances often arranged in circles or semicircles. There may be one or more groups of this character occurring upon the back, neck, and face. They are few in number if they occur late in the disease. They disappear by absorption or by breaking down, forming a sharply cut ulcer with a perpendicular edge. If several of these lesions break down at once and coalesce, they form a large ulcer having scalloped edges. These ulcers are always covered with a thick greenish crust which softens and is easily removed when moistened. As a rule they progressively but slowly enlarge and have no subjective symptoms. Upon healing they leave a scar like that of a burn.

The **squamous syphilide** is usually not considered as an individual lesion but rather a scaliness of the other forms. They are usually papules or tubercles which are scaly and occur after the second year. They are most commonly found upon the palms and soles where they form circular or ring-shaped figures. This is differentiated from squamous eczema of the palm by the fact that in syphilis there is little or no itching. Squamous syphilides have a swollen appearance. They are often unilateral and crescentic in shape.

The **pustulocrustaceous syphilide** is characterized by large deep-seated pustules or ulcers which are covered by prominent and peculiar crusts. These lesions always occur late and are always localized on the scalp, face, and extremities but rarely affecting other parts. They assume three forms; viz., the ecthymatous, rupial, and pemphigoid.

(a) The **ecthymatous** form begins as one or more round flat pustules one-fourth to one-half inch in diameter, sometimes becoming as large as a half dollar. Their base is hard and swollen and surrounded by an inflammed areola. The pus dries and forms a green or dark brown crust, the center of which is de-

pressed. As the crust dries, it becomes detached from the edge of the sore and is easily removed. Beneath the crust is a thick pus that soon dries, forming another crust. If the sore is washed out upon removal of the crust, the typical syphilitic ulcer with its perpendicular edge is seen. This ulcer may heal and leave a scar like that of a burn; but if it does not heal, it forms the ulcerative syphilide.

(b) The **rupial** form is also called rupia and is characterized by a conical laminated crust over a superficial ulcer. This may begin as a superficial pustule or bulla upon which a greenish crust develops and under which suppuration exists. The margin of the ulceration extends a little beyond the original crust. A new crust forms beneath the old one, raising it up. After this has been repeated a few times, the crust becomes arranged in layers one-half inch in thickness and about two inches in diameter. If the lesions are numerous, the ulcers are usually small, and if few they are large. If the ulceration occurs more rapidly at one end of the sore than at the other, it will be found that the crust is uneven in thickness.

(c) The **pemphigoid** or **bullous** form is very rare in acquired syphilis and common in the transmitted form. It consists of an eruption of superficial, purulent, flattened bullae one-fifth to one inch in diameter. They are surrounded by a dull red areola and soon become covered with dark green crusts which are closely adherent.

The **gummatous syphilide** is one of the most common and characteristic lesions of late syphilis. It consists of a deposit of gummy material in the subcutaneous tissue from which it extends into the skin. It may take on the form of a single tumor, a group of nodules, or a diffuse infiltrated patch. It may undergo absorption and disappear or break down and ulcerate. A single gumma begins as a small pea-sized structure beneath the skin and grows slowly, requiring several weeks or months to attain the size of a hazel nut. They are freely movable, firm, elastic, painless, and roll under the skin.

As it increases in size, it becomes movable; and the skin over it assumes a red color. It may feel soft upon palpation but will not discharge any amount of fluid when opened. The scalp and forehead are the favorite locations for the formation of gumma, where they may become as large as a hen's egg. If the gumma undergoes ulceration, a deep round ulcer is formed. A gumma differs from malignant tumors and abscesses in that it is not attended by pain and will fluctuate under pressure as it increases in size. When involving the skull bones, it has crepitus; and when opened it gives off a small quantity of bloody serum.

The **ulcerative syphilide** always results from other lesions of the disease, usually tubercular, pustulocrustaceous, or gummatous and is divided into three classes; viz., superficial, serpiginous, and deep or perforating.

(a) The **superficial** ulcer is circular in shape with sharply cut edges, has a dirty yellowish purulent base the size of a quarter or half dollar, and occurs on the face and legs. They may occur early in the disease and nearly always result from the pustulocrustaceous syphilide.

(b) The **serpiginous** ulcer is so named because it tends to creep over the surface leaving a cicatrix as it passes along. It may develop from other ulcers, tubercules, or pustules and creeps in a circular manner. The tissue in the center has a normal appearance—an important differential sign from other similar ulcers. It is most often seen on the back and the extremities, is not painful, and does not necessarily impair the patient's health.

(c) **Deep** ulcers form from a breaking down of gummatous deposits and have a crater-like cavity due to the opening being smaller than the softened mass. If they are numerous in one location, they may coalesce beneath the skin, involving the deep structures. Their course is indefinite as they may perforate or heal.

Zoster

Definition.—An acute inflammatory disease of the cutaneous nerves characterized by a unilateral eruption of groups of vesicles situated upon a reddened base and found along the course of the affected nerve. It is also called **herpes zoster** and **shingles.**

Adjustment.—Local with K. P.

Pathology.—The structural changes are those of simple inflammation involving the substance of a cutaneous nerve with its posterior ganglion and the papillary layer of the corium.

Symptoms.—The first stage is that of neuritis, lasting for a few days or several weeks and marked by slight or severe pains. These premonitory pains are followed by the appearance of an eruption consisting of groups of small papules, which soon develop into tense vesicles. These vesicles vary in size from a pinhead to a split pea or larger and always have a red base. The vesicles may become turbid, dry up, disappear, and be followed by other groups of vesicles. Mild cases usually terminate in a week or ten days, while severe cases may last weeks or months, during which the lesions are attended by severe burning and stinging pain. The most common location is one or two intercostal nerves from the spine to the sternum, but it may affect nerves of the head and extremities. It is not uncommon to find the eruption following the course of the supraorbital branch of the trifacial nerve. The number of vesicles vary from two to hundreds in a group; and they may coalesce, forming blebs.

It differs from herpes simplex in that it is usually unilateral, its vesicles do not break to form crusts, and it is always accompanied by pain of a neuralgic character radiating along the course of the affected nerve. The prognosis is always favorable under adjustments.

Varicose Veins

Definition.— A localized or circumscribed dilatation of the superficial veins.

Adjustment.—Local with K. P. Most varicosities are found in the lower extremities, hence the local adjustment is a lower lumbar.

Pathology.—From a causative standpoint these dilatations may result from venous obstruction due to pelvic, abdominal, or thoracic tumors which press upon the vessels draining the affected part or the inferior vena cava; or it may be produced from diminished cardiac power associated with involution of the vein wall. In all cases the vein wall is stretched, causing it to assume a saccular or pouch-like formation.

Symptoms.—Varicose veins are common in both sexes but are more common in fleshy people and those following occupations where they are required to stand for long periods at a time. The appearance of the varicosity is gradual with aching pains in the legs. The veins are darker in color than the blood they contain, due to intensification of the color in transmission through the skin. One or both legs may be affected; and the dilatations, which vary in number, may extend from the hip to the ankle. Most commonly they are found on the calf of the leg and the inner surface of the lower portion of the thigh. They vary in size from slight distentions to enormous varices one to two inches in diameter. If the relaxation of the vessel walls is very great, there may be hemorrhages, both external and beneath the skin. Those occurring beneath the skin cause it to have a purple-black color, and after repeated subcutaneous hemorrhage the overlying skin remains permanently pigmented. The broken skin at the point of hemorrhage often becomes the site of varicose ulcers.

Varicose ulcers are most commonly located on the anterior surface of the lower half of the leg and may be superficial or deep. They are irregular in shape with sloping or undermined edges and are surrounded by a wide zone of redness and in-

filtration. Their bases are covered with flabby granulations, a scanty secretion, or a purulent exudate. They may be single or multiple on one or both legs. The foot and leg are greatly swollen from the edema. This edema is greater after standing and is lessened by keeping the body in a horizontal position. The ulcers are tender, and the patient complains of considerable pain. Upon healing they leave large scars. The prognosis is good under adjustment at K. P. and lower lumbar, sacrum, or ilium.

CHAPTER XVII

HERNIA AND HEMORRHOIDS

Hernia

Definition.—A swelling formed by the displacement of a soft part, which protrudes through a natural or artificial opening from the cavity in which it is normally contained. The word is derived from Latin meaning a rupture, a burst, or a descent.

Classification.—1. Femoral hernia.
   (a) Complete.
   (b) Incomplete.
2. Inguinal hernia.
   (a) Direct.
   (b) Complete oblique or scrotal.
3. Umbilical hernia.

Any of the above may become strangulated. Any of the three cavities of the body may be the subject of hernia, but those of the cranium and thorax are extremely rare and usually the result of traumatism, hence are not considered here. Many parts of the abdominal wall may become the site of hernias, but they most commonly appear in the front, lower regions, which, being destitute in great measure of muscular fibers and being the site of many of the openings leading from the abdomen to the lower extremities, offer less resistance to the displacement of the viscera.

Pathology and Deranged Anatomy

Femoral Hernia. A portion of the intestine passes through the femoral or crural ring, the upper opening of the femoral canal. A pouch of the peritoneum is forced before the intestine and is called the hernial sac. If the viscus does not pass through the saphenous opening, it is called an **incomplete** femoral hernia and when protruding through the saphenous opening is called a **complete** femoral hernia. The coverings of a femoral hernia are: peritoneum, subserous areolar tissue, septum-crurale, crural sheath, superficial fascia, and skin.

Inguinal Hernia. A portion of the intestine passes through the internal abdominal ring, the conjoined tendon or aponeurosis of the internal oblique or transversalis muscles into the inguinal canal and protrudes through the external abdominal ring. If the viscus escapes through the external abdominal ring into the scrotum, it is called a **complete oblique** inguinal hernia or **scrotal** hernia. A **direct** inguinal hernia is one in which the protrusion makes its way through some part of the abdominal wall internal to the epigastric artery. In most cases it is forced through the conjoined tendon, or the tendon is forced along before the viscus, forming one of its coverings. If the hernia, with its sac can be replaced, it is said to be reducible and as a rule is not very troublesome unless it attains great size. A hernia is said to be **strangulated** when it is not only irreducible but also subjected to a continual constriction; this constriction may be produced by different causes but usually occurs at the internal abdominal ring where a few fibers of the internal oblique or transversalis muscles contract, pinching the protruding viscus. The covering of an inguinal hernia are peritoneum, subserous areolar tissue, cremaster muscle and fascia, intercolumnar fascia, superficial fascia, and skin.

Umbilical Hernia. Some of the abdominal viscera protrudes through the umbilicus by stretching the remains of the um-

bilical cord and passes between the two recti muscles. The size and extent of the contents are variable.

Adjustment.—Lower dorsal and lumbar regions according to spinal findings.

Symptoms.—Inguinal hernia is by far the most common form and predominates in the male sex. Any circumstance which diminishes the resistance of the abdominal walls or breaks the equilibrium existing between them and the viscera, which react and mutually press upon each other, would have an etiological bearing on hernia. The simultaneous contraction of the diaphragm and the abdominal muscles which takes place on every violent effort is one of the chief of the causes. When a hernia is produced suddenly by traumatism, it is attended by great pain in the region of the protrusion. Inspection will show a visible and palpable swelling external to the external abdominal ring. The swelling is very hard and oblong in shape, the long axis usually being parallel with Poupart's ligament. Within a few days or weeks all pain subsides, except when straining, which most patients with hernia will avoid. Inguinal hernia may be unilateral or bilateral and is often said to be single or double according to the number. Most cases of inguinal hernia are reducible by taxis, and when reducible and having no matted adhesions which would tend to hold the displaced viscus in the canal the prognosis is favorable under Chiropractic adjustments. Many cases of long standing respond slowly or fail to respond due to these adhesions and atrophy of the structures normally holding the viscus in place because of its prolonged nonuse.

When inguinal hernia becomes strangulated; it is always attended by great pain, localized in the region of the hernia; nausea; persistent vomiting, which may be of a fecal character; and later development of the signs of gangrene, which is due to obstruction of the vessels in the compressed viscus.

In femoral hernia the protrusion is below Poupart's ligament in the upper and inner part of the thigh. They are usually small in size and difficult to palpate because of being

abundantly supported by the fascia and muscles of the thigh. A femoral hernia is hard under palpation, and most of this type are of the incomplete type. This form of hernia is most commonly found in the female sex.

An umbilical hernia can always be detected by inspection and further verified by palpation. Most umbilical hernias are small and contain but a small loop of the intestine. Rare cases have been known, however, in which the hernia contained the liver, stomach, and the bulk of the small intestines.

If patients have been wearing a truss or other support prior to taking adjustments, it is wise that they continue to do so until the weak parts become so strengthened by the adjustments so that protrusion of the viscus is prevented. Hernia is but a motor neurosis due to local vertebral subluxations pressing on the motor nerve fibers leading to some part of the abdominal muscles, causing them to weaken and relax, permitting the viscus to protrude through the dilated opening or through the separated fibers constituting a hernia. Chiropractic adjustments release the pressure upon the motor nerve fibers, thus restoring the transmission and permitting the normal expression of the motor impulses in the affected muscles.

Hemorrhoids or Piles

Definition.—Hemorrhoids are tumors chiefly composed of dilated blood vessels, hypertrophied connective tissue, or blood clots situated beneath the mucous membrane of the anus or rectum.

Adjustment.—The primary cause of hemorrhoids is a lower lumbar subluxation, but many cases may be shown in which the hemorrhoid was produced suddenly during severe muscular strain, such as heavy lifting, etc. Costiveness, constipation, overeating, prolonged standing, etc., when the tissue of the rectum is weakened by the local subluxation, tend to bring about the development of hemorrhoids and are often assigned as being the secondary or exciting cause.

Pathology.—**EXTERNAL HEMORRHOIDS** are those occurring below the margin of the anus and are classified as thrombotic, varicose, inflammatory, and connective tissue.

Thrombotic hemorrhoids of the external variety are usually produced by thrombosis of the inferior hemorrhoidal veins or rupture of the vessel and clotting of the effused blood in the adjacent tissue.

Varicose external hemorrhoids are produced by a varicosity or localized dilatation of the subcutaneous veins around the anus and are very apt to occur during heavy lifting or straining.

Inflammatory external hemorrhoids result from an inflammation of the folds of the anus, causing them to become swollen and edematous. They are pear-shaped and the small end often extends within the external sphincter.

Connective tissue hemorrhoids are also called fleshy piles and consist of hypertrophied mucocutaneous tissue about the margin of the anus. Sometimes this connective tissue contains much fat.

INTERNAL HEMORRHOIDS are those occurring above the margin of the anus and are classified as thrombotic, varicose, capillary, and mixed.

Thrombotic and varicose internal hemorrhoids differ from the external varieties only in the position in which they are found in the rectum. Those of the internal variety are found higher up in the rectum and affect the superior hemorrhoidal veins. The varicose internal hemorrhoid is the most common of all forms. **Capillary** hemorrhoids are small raspberry-like developments of the arterial capillaries of the rectal mucosa, resulting from dilatation of their walls. The term **mixed hemorrhoids** is used to describe a condition where external and internal hemorrhoids exist at the same time and structurally may be any of the above described types.

Symptoms.—**Thrombotic external piles** begin suddenly while under some severe muscular strain when the patient feels a

slight pain in the region of the anus. Examination will show a small round swelling, which is blue in color due to the obstructed vessel containing deoxygenated blood. Pain and tension are increased for the first few hours. The patient is unable to sit, and movements of the bowels are most distressing. Within 24 hours the pain is less acute; but sensations of weight and aching continue, being more severe with each movement of the bowels.

Varicose external piles consist of one or more circumscribed dilatations of the vessels around the anus. They increase in size at each movement of the bowels when there is any straining and are common in people who are constipated or follow occupations demanding much muscular strain. They may be made to disappear temporarily by elevating the hips, as this position aids gravity in draining the veins. They begin slowly without pain or protrusion; and when small most patients are unaware of their existence. The pile is of a dark bluish color and forms a cushion-like mass around the anus. When becoming large they protrude and have a great tendency to bleed. This form of hemorrhoids yields very readily to adjustments of the lower lumbar vertebræ.

Inflammatory external hemorrhoids may be single or multiple and begin with itching, burning, and a sense of uneasiness. Examination shows an oval swelling about the size of a hazel nut to that of a small egg. They are deep red in color, painful to the touch, and not very hard; they are often covered by mucous membrane which has been dragged down from its normal position in the rectum. When much inflammation exists, there may be a spasm of the external sphincter which makes the sitting position almost impossible. Defecation is dreaded and very painful, therefore most cases are constipated due to the voluntary retention. Between two of the piles may be found a small fissure or ulcer or a pocket filled with fæces. The inflamed structures may ulcerate and slough, leaving a scar, shrink, and disappear with the inflammation or become chronic and form connective tissue piles. Lying upon the side

with the hips elevated is the most comfortable position. Usually some relief can be obtained by a very few adjustments, almost all cases recover in time.

Connective tissue piles are not painful, do not bleed, and have no peculiar outline or color. They may be single or multiple, thick or thin, and pedunculated or flat at their bases. As a rule they protrude to a marked degree and may become inflamed by the irritation of prolonged sitting upon a hard surface, passing hard dry stools, etc. If they become inflamed, they are then painful. These cases are slow to respond under adjustments.

Thrombotic and varicose internal hemorrhoids differ from the external variety only in the position in which they are found in the rectum. Those of the internal variety are found higher in the rectum and affect the superior hemorrhoidal veins.

Varicose internal piles are the most common of all varieties and are first indicated by two cardinal symptoms, bleeding and protrusion. When the pile is not inflamed, there is little or no pain present; but the amount of hemorrhage may be very great. The bleeding in internal piles usually occurs after the passage of the fæcal mass. It is of a dark red color but may brighten after being exposed to the air. Blood coming from higher in the intestine is of a tarry black color, is mixed with the fæces, and will turn pink when placed in water. Protrusion does not occur until the hemorrhoids have attained considerable size and then takes place gradually. At first they come down but a short distance and appear to the patient as an incompleted stool. During the early stages they recede readily; but as they become larger and extend farther down, it is difficult to replace them, as the sphincter in contracting obstructs the flow of blood, causing them to swell extensively. When pressed upon by a contracted sphincter the pain may be very severe. There is always more or less mucous passed from the rectum and when abundant is sometimes called white hem-

orrhoids. It forms as an exudate from the inflamed mucous membrane.

Capillary hemorrhoids are small raspberry-like developments of the arterial capillaries close to the surface of the mucous membrane of the rectum. They are covered with a very thin layer of epithelium which is easily ruptured, causing frequent hemorrhages. They do not protrude and are very difficult to locate upon digital examination. They very closely resemble the capillary nevus and for that reason are sometimes called nevoid hemorrhoids. They are also often called **blind bleeding piles.** When they have existed for some time, the dilatation becomes so great that it involves the veins and the adjacent connective tissue so that a varicose venous hemorrhoid is the final result. **Mixed hemorrhoids** is the name applied to those cases in which both the superior and inferior hemorrhoidal veins are involved in the varicosity with symptoms of each variety resulting. The division between them is always clearly marked by the so-called white line of Hilton. This line marks the attachment of the external sphincter to the lower end of the gut. The existence of this line with piles before and below it constitutes the condition known as mixed piles.

Prolapse of the Rectum

Definition.—A partial or complete protrusion of the rectum or its mucous membrane through the anus; thus the term may signify any form or degree of descent of the rectum.

Adjustment.—Lower lumbar.

Pathology.—This consists of an exaggeration of the normal physiological exertion which occurs at every defecation. The elastic tissue which draws the mucous membrane back becomes stretched and permanently elongated, failing to draw the mucous membrane upward and also allowing the rectal wall to prolapse.

Symptoms.—The condition begins very gradually without

pain, itching, or discharge of any kind. After gradually increasing for a time discomfort is produced and hemorrhoids develop. The extent of the protrusion varies from one-half to two inches. At first the membrane is normal in color but if it becomes inflamed is red or purplish. Upon the development of inflammation there is pain, bleeding, and often ulceration. The prognosis is very favorable under adjustments.

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Vitamin Therapy Hints.

A - infections skin (with F). colds —

C - Blood vascular (colds for kids) Varicose veins.

B - all nerves + pain + muscles.

D + Calcium - Bone, tendinitis + ligaments (ultra sound)

A + C - Both for sinus + kidneys.

Fe - Muscle cramps
(also calcium)

Fe + Liver - Low Blood pressure + anemias.

Nausea = a desire to vomit.

Ptosis = prolapse, or falling.

Engorgement = to cause an excessive local amount of blood in a part or organ.

Bursa = a small sac interposed between parts that move upon one another.

Apoplexy = a sudden effusion of blood into the substance of an organ.